

WIRELESS APPARATUS IN USE OR
AVAILABLE FOR USE IN THE
ROYAL AIR FORCE
1ST APRIL, 1918 - 1ST SEPTEMBER, 1923.

BASED ON F.S. PUBLICATION 110 (PARTICULARS OF
WIRELESS APPARATUS IN USE IN THE ROYAL AIR
FORCE, DECEMBER, 1918), - AIR PUBLICATION 809
(PRICED VOCABULARY OF ROYAL AIR FORCE
EQUIPMENT), - F.S. PUBLICATION 29/W.T.
(ESTABLISHMENT OF WIRELESS STORES AND
EQUIPMENT (PROVISIONAL)), - ETC.

PART II
DIAGRAMS ONLY

ROYAL AIRCRAFT ESTABLISHMENT

26TH NOVEMBER, 1923.

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FORWARD by GMB

FORWARD by Group Captain Tillyard

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Ta TRIPLE VALVE AMPLIFIER
W/T RECEIVER Model Tb
W/T RECEIVER Model Tc
W/T RECEIVER Model Td
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PRINCIPLE of TUNING on 130-330 Metres Range; 150-350 Metre Range using 1st Valve only
500-700 Metre Range using 1st Valve only; 1000-2500 Metre Range using 1st valve only
Tf RECEIVER adapted for Direction Finding using 1st valve only
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(no title)
LOCATING STRANDED AIRCRAFT SET
ARRANGEMENT of D.F. COILS in Handley Page Machine
SWITCH WIRING for modified Tf RECEIVER
WT SET FIELD PORTABLE; 120 WATT TONIC TRAIN with Telephone Attachment

FORWARD by GMB

Version 1 - 27th December 2017

I found this document at the RAF Hendon Archive.

It is the second part of a summary of all wireless equipment in use by the RAF at the end of WW1 and slightly beyond. This part is just the circuit diagrams but does contain a helpful forward by Group Captain Tillyard which gives his view of equipment use.

Another source is Erskine-Murray and here is my summary of that:

AIRCRAFT SPARK TRANSMITTERS						
TX	Band	Weight	Power Source	Power Input	Use	Notes
No.1	100-260m	4.4kg	6V lead-acid	30W	Artillery cooperation	
No.2	100-260m	4.4kg	6V lead-acid	30W		
T52	100-335m	4.4kg	8V lead-acid	40W		
T52M	150-410m	4.4kg	8V lead-acid	40W		
T52A	150-410m	4.1kg	Wind-alternator (3.6kg)	150W	Long range spotting and anti-submarine	
T52B	150-410m 500-600m	22.7kg inc. battery	16V lead-acid	100W	Grand fleet spotting and patrol seaplanes and airships, anti-submarine etc.	
T54B	200-335m 500-600m	11.6k	2x14V lead-acid	120W		
T55A	200-600m	39kg total	180V 500Hz alternator	2kW		
AIRCRAFT CW TRANSMITTERS						
T57	1000-2500m	6.6kg	5kg wind-generator + 5.4kg 6V lead-acid	75W	Sea-planes etc.	2 valves A, A2 or F
TW	900-1100m	1.8kg transformer	8.2kg BTH 600V generator + 5.4kg 6V lead-acid	40W		1 valve B (army)
Mark II	800-1050m	2.3kg	8.2kg BTH 600V generator + 5.4kg 6V lead-acid	40W		1 valve (plus spare) B
W/T TRANSMITTERS						
T56B + telephone attachment	1000-2500m		1000-2500V dc generator	250W to 300W	Ground Stations	1 valve T2B or T2A
RAF Type XI	300-1200m		1000-2000V dc generator	200W to 300W		2 valves T2B
Field Portable 120W	600-1000m		HT unit producing ac from 28V battery	120W		2 valves Marconi T Erecta (plus spare)

T.W. Aircraft Mark II	350-450m	4.1kg	8.2kg BTH generator plus 5.4kg 6V battery	40W	Aircraft	2 valves B or F
T57 + telephone attachment	1000-2500m	6kg	5kg Newton HT generator plus 5.4kg 6V battery	75W		2 valves A, A2 or F
CRYSTAL RECEIVERS						
Ta	100-900m	6.8kg			Aircraft	Carborundum detector
Tb	100-600m					Carborundum detector
Td	150-335m	2.4kg + relays				Carborundum detector
Short Wave Tuner Mark III, III*	120-700m				Ground station	Carborundum , Perikon or Valve detector
Naval Type “C”	300-8000m					Crystal or valve
VALVE RECEIVERS						
CW Mark II	400-800m	3.6kg inc remote control	6V battery and HT unit		Ground station	3 valves R
Tf	150-2500m	4.1kg	6V battery and HT unit		Aircraft	3 valves R
Tuner Aircraft Mark III	350-450m 600-800m	5kg inc remote control	6V battery and HT unit			3 valves R
RAF T10	250-550m	3.6kg inc remote control	6V battery and HT unit			5 valves 2xC (RF) D (detector) 2xC (AF)
Mark C CW	700-1200m					2 valves R
VALVE AMPLIFIERS						
RAF Type XII	300-800m				Ground Station	5 valves 4xC + D
Tb relay		3kg	6V battery and HT unit		Aircraft	3 valves R used with Tb
Th	900-10000m	4.7kg				7 valves R

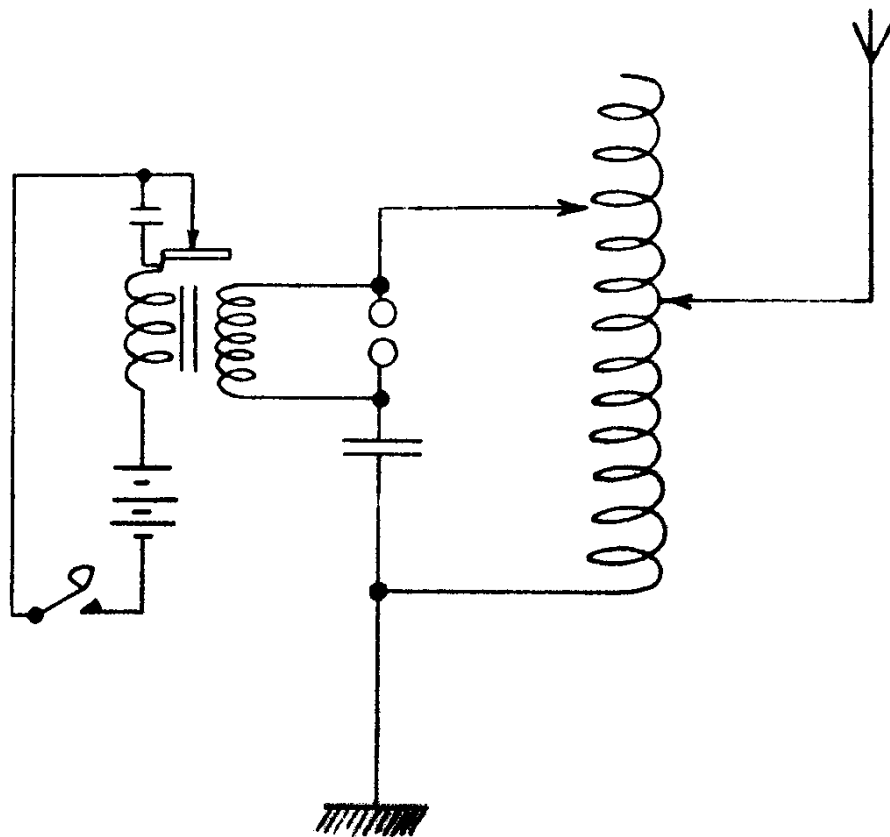
"WIRELESS APPARATUS IN USE OR AVAILABLE FOR USE IN THE
ROYAL AIR FORCE 1st APRIL, 1918 - 1st SEPTEMBER, 1923.
PART II. DIAGRAMS ONLY".

Some notes by Gp Capt R Tillyard (Retd)

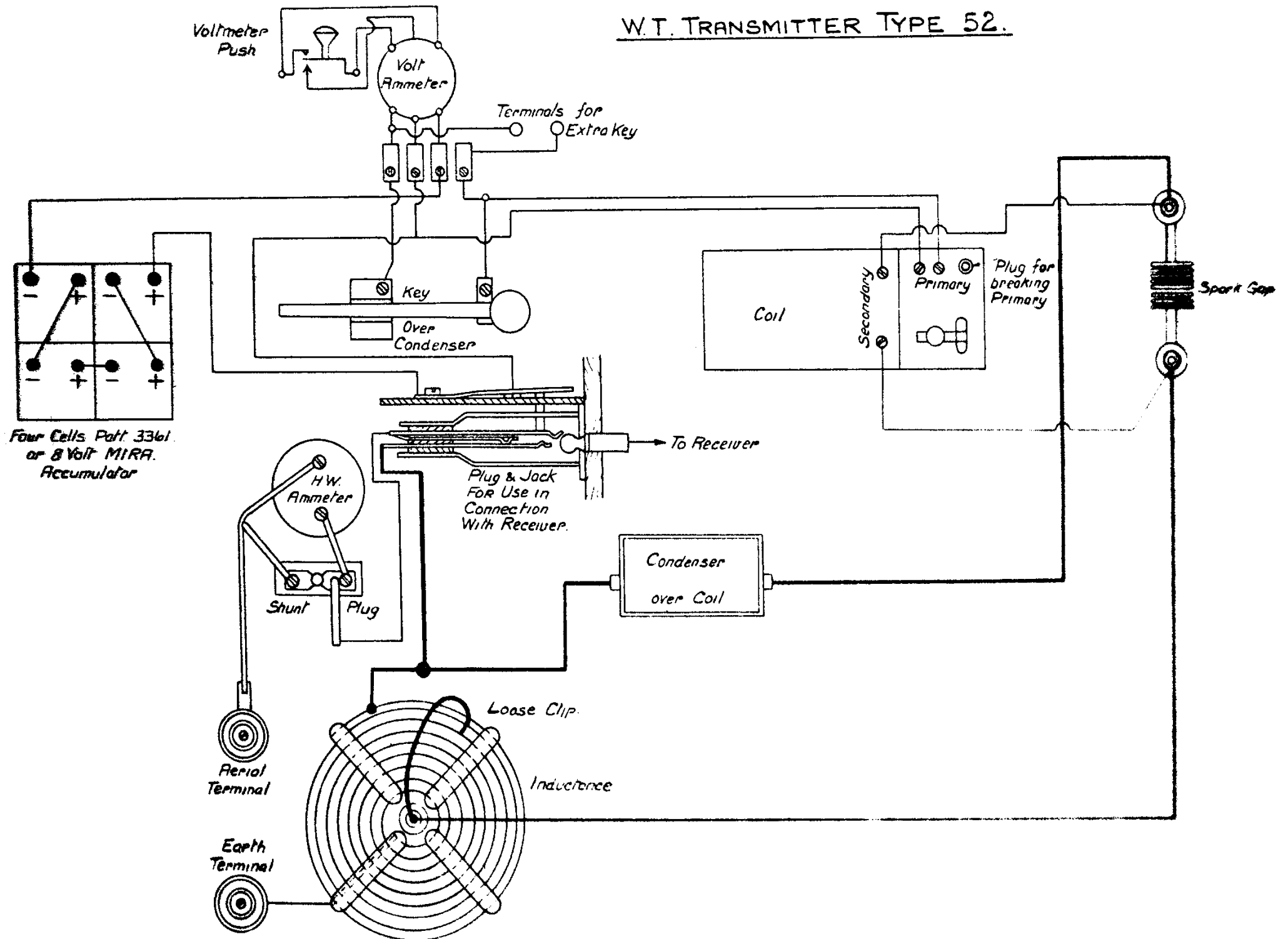
1. Sorry no trace of Part 1.
2. Quite a lot of the radio equipment illustrated was of an experimental nature only a few models of which even came into Service use.
3. Page 1 has the circuit of the first operational airborne spark transmitter, used for artillery observation between 1917 and 1918.
4. Pages 12-13 portray the T19 series of medium and low frequency ground transmitters. These were used for ground point-to-point communications and also for ground-air work. The last transmitter in this series was the T19b which was the standard set in use between 1928 and 1938 at all RAF stations at home and abroad. A T19b was fitted (exceptionally) in the R100 airship. The bright emitter valve used was called the VT5b of anode dissipation 250 watts. High tension was provided by a mains-excited 1kw generator delivering 1000 volts.
5. Pages 15-17 are on the T21 series of medium and long wave aircraft valve transmitters which followed the earlier spark sets. The most famous version was the T21c which was standard fit between 1925 and 1938 for aircraft such as the Vickers Valentia, Virginia and Victoria, the Fairey IIIc and Hawker Hart variants. Bright emitter VT1A valves were used in the set, two in parallel, with LT from a 6 volt accumulator battery and HT at about 900 volts either from a wind-driven generator mounted on the wing or from a 80 watt motor-generator driven off the aircraft 12 volt supply. Maximum communication range was of the order of 100 miles using a 250 foot trailing aerial wire.
6. Page 26 covers the T28 long-range low frequency point-to-point transmitter used for RAF inter-Command communications between Ismailia (Egypt), Hinaidi (Iraq), Aden, Ambala (India) and Singapore up to about 1930. The transmitter fed a roof aerial suspended between 300 ft masts at each location.
7. Pages 27/28 show the T30 high power LF transmitter used for point-to-point communications between UK and Ismailia. This was big brother to the T28 and was replaced by high-frequency (short wave) equipment in 1930.
8. Page 30 shows the earliest operational aircraft receiver using a crystal detector.
9. Page 35 contains the circuit of the first airborne receiver using a valve as a detector (there appears to be an error in the drawing - the grid leak resistor is not shown).
10. Pages 36-41 show the most famous of the Ta series of airborne receivers, the Tf. This was companion to the transmitter T21c (para 5 above) in all bomber, transport and reconnaissance aircraft between 1925 and about 1938. Again, it operated on the medium and long waves using the same aerial as the transmitter, changed to either by a 'send-receive' switch. The valves used were VR12f with 2 volt filaments supplied from an accumulator and 100 volts HT from dry batteries.
11. Page 52 shows the 'R27'. This was not a receiver but a tuner with four rejector circuits which could be plugged into progressively to overcome interference. It was standard ground receiver equipment between about 1922-1930 and worked into an amplifier, the first valve of which was the detector, usually the A12 shown on page 61.
12. Page 75 shows the Wavemaster No 3, the only physical example of which is known to be in the Science Museum. This was used in the air and on the ground for measuring transmitter frequency. It was held near the transmitter and, when tuned, a small 'P' lamp lit up to indicate resonance. In service dates were 1923-1937 approx when it was part of the "Tf - T21c" airborne radio installation. In open cockpit aircraft such as the Bristol Fighter and Hart a special leather strap was fitted on the floor of the rear cockpit for stowage purposes.

TRANSMITTER AIRCRAFT. 30 WATTS N° 1 & 2.

(THEORETICAL)

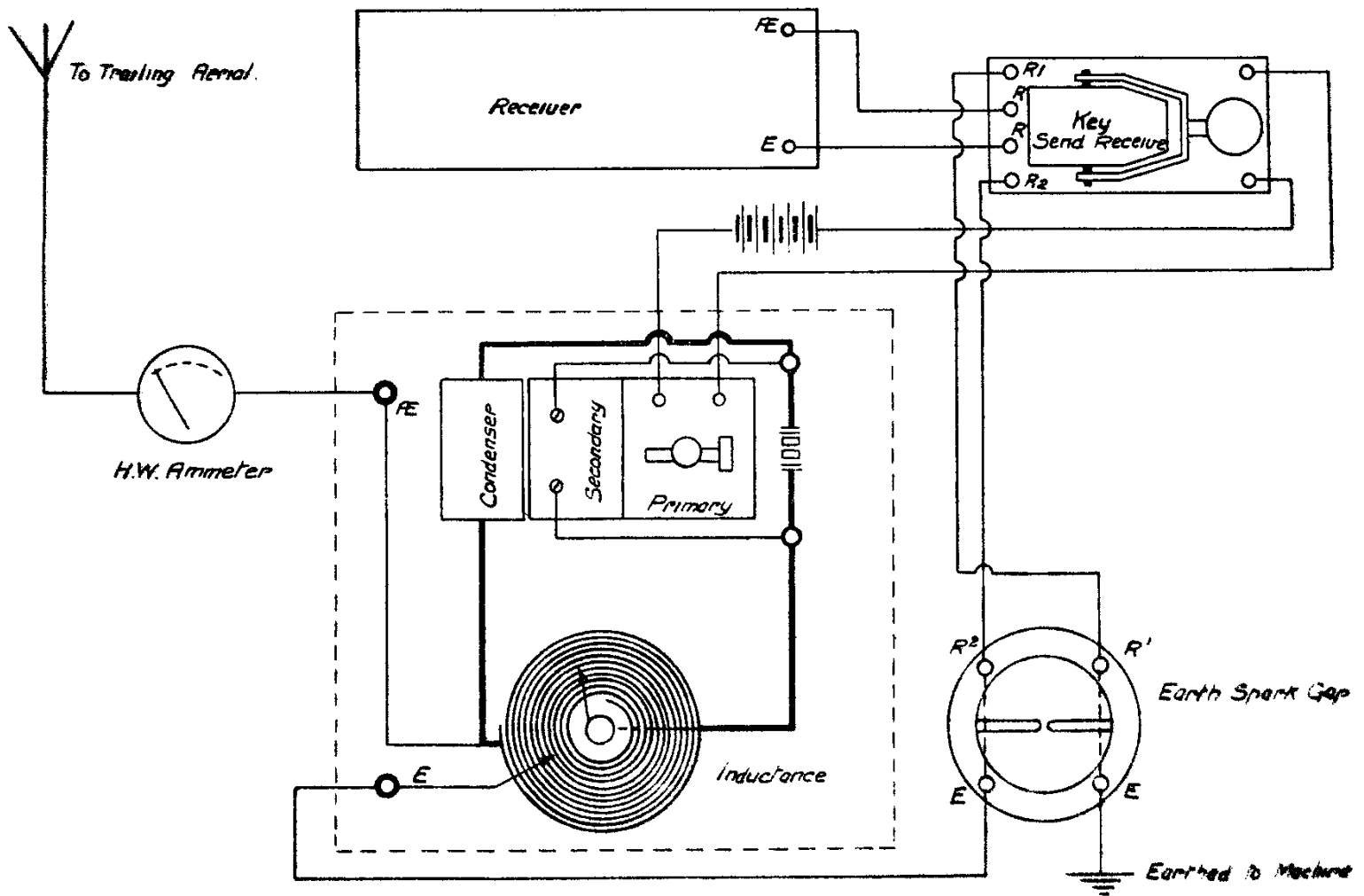


W.T. TRANSMITTER TYPE 52.

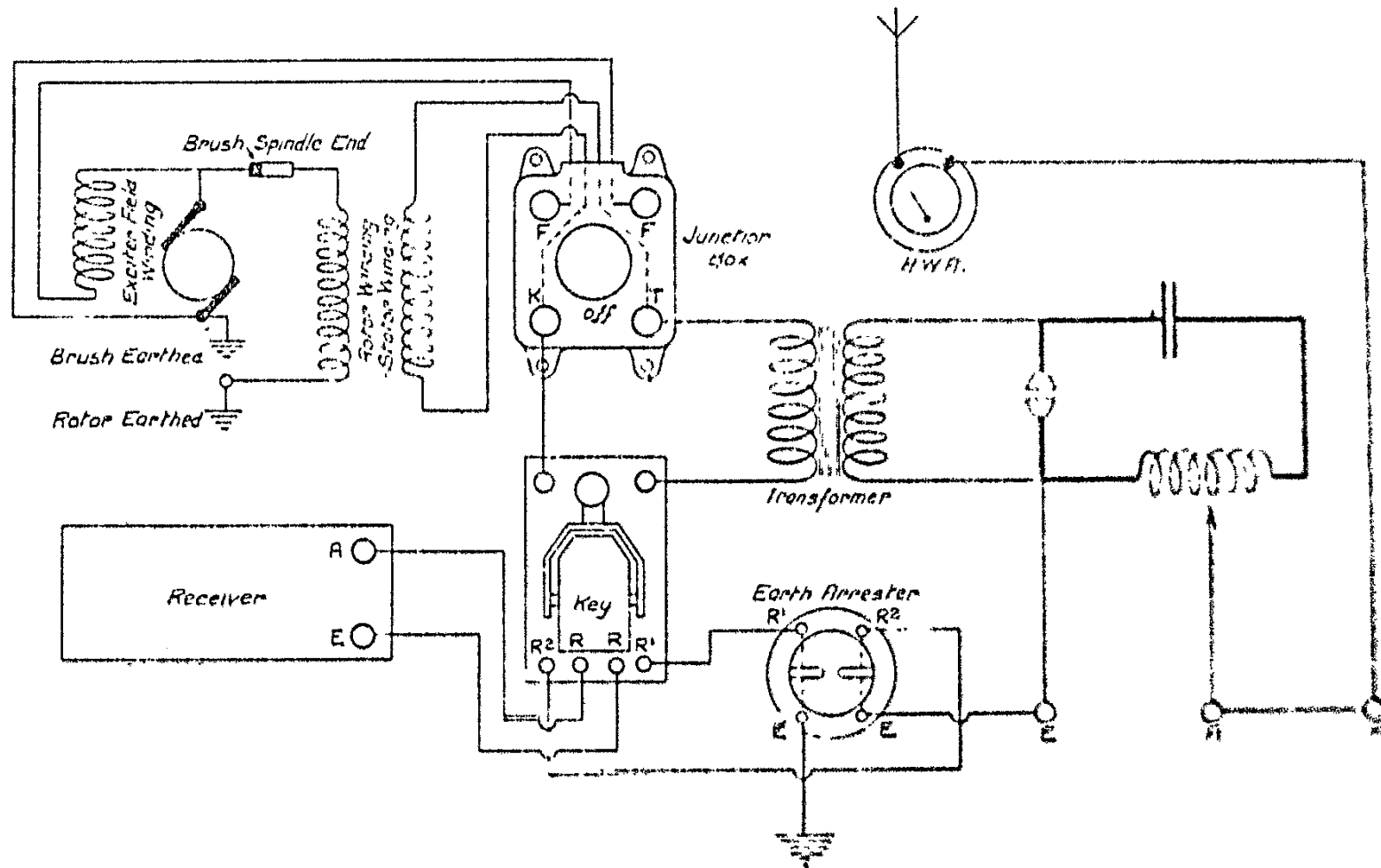


W.T. TRANSMITTER . TYPE 52.

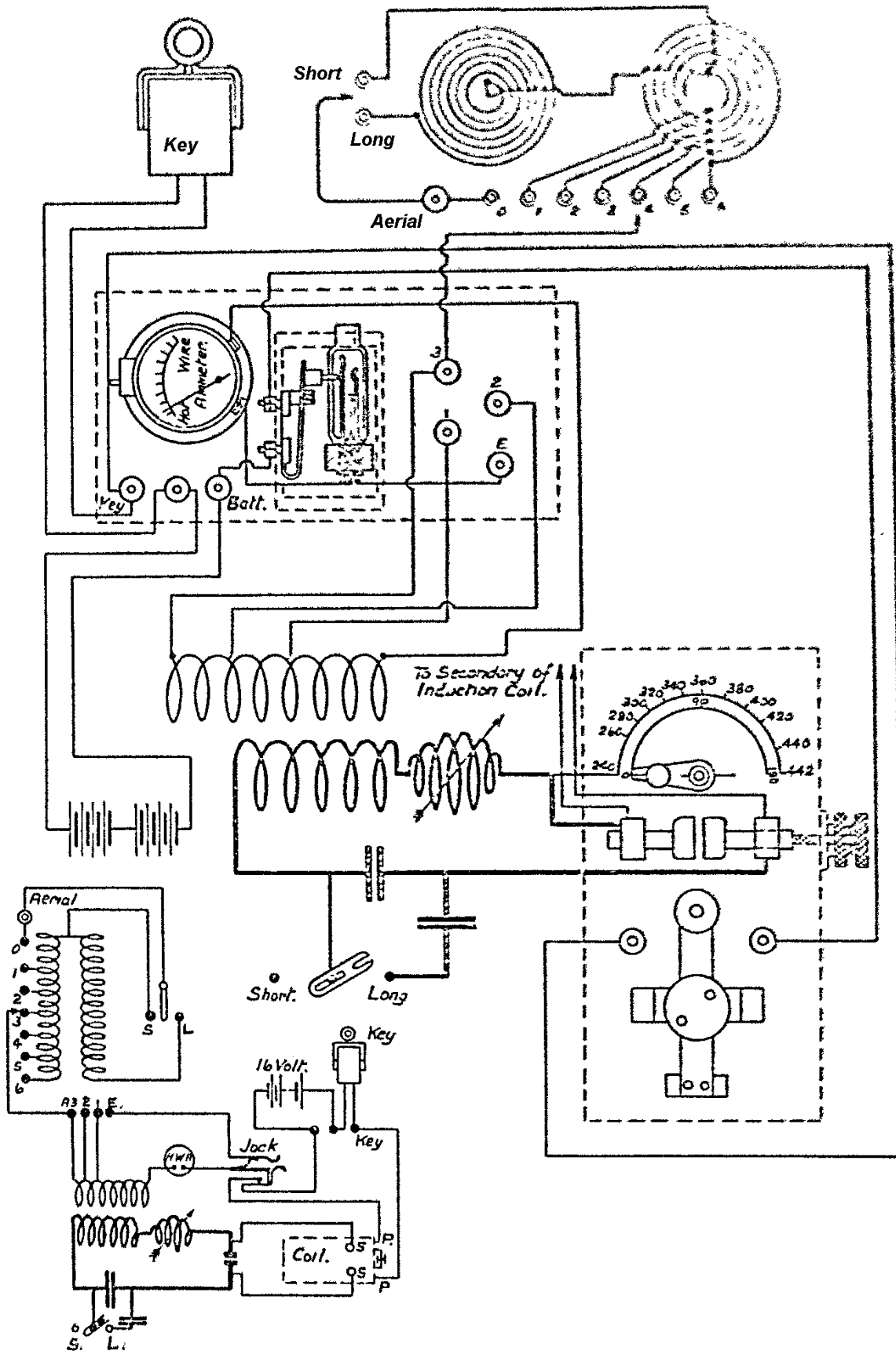
WITH RECEIVER, SEND RECEIVE
KEY, & EARTH SPARK GAP.

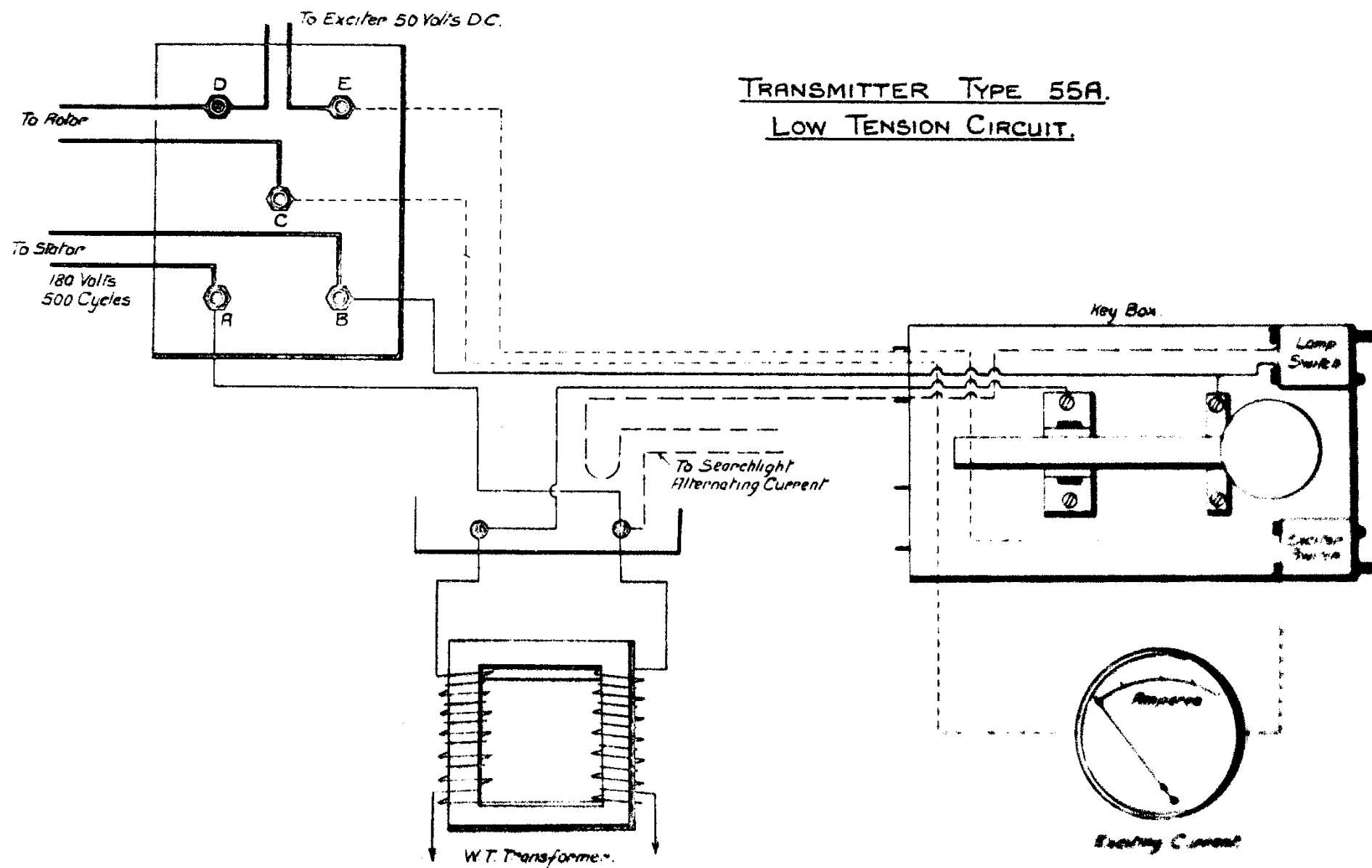


TYPE 52A W/T TRANSMITTER.
WITH EARTH ARRESTER SEND & RECEIVE KEY & RECEIVER.

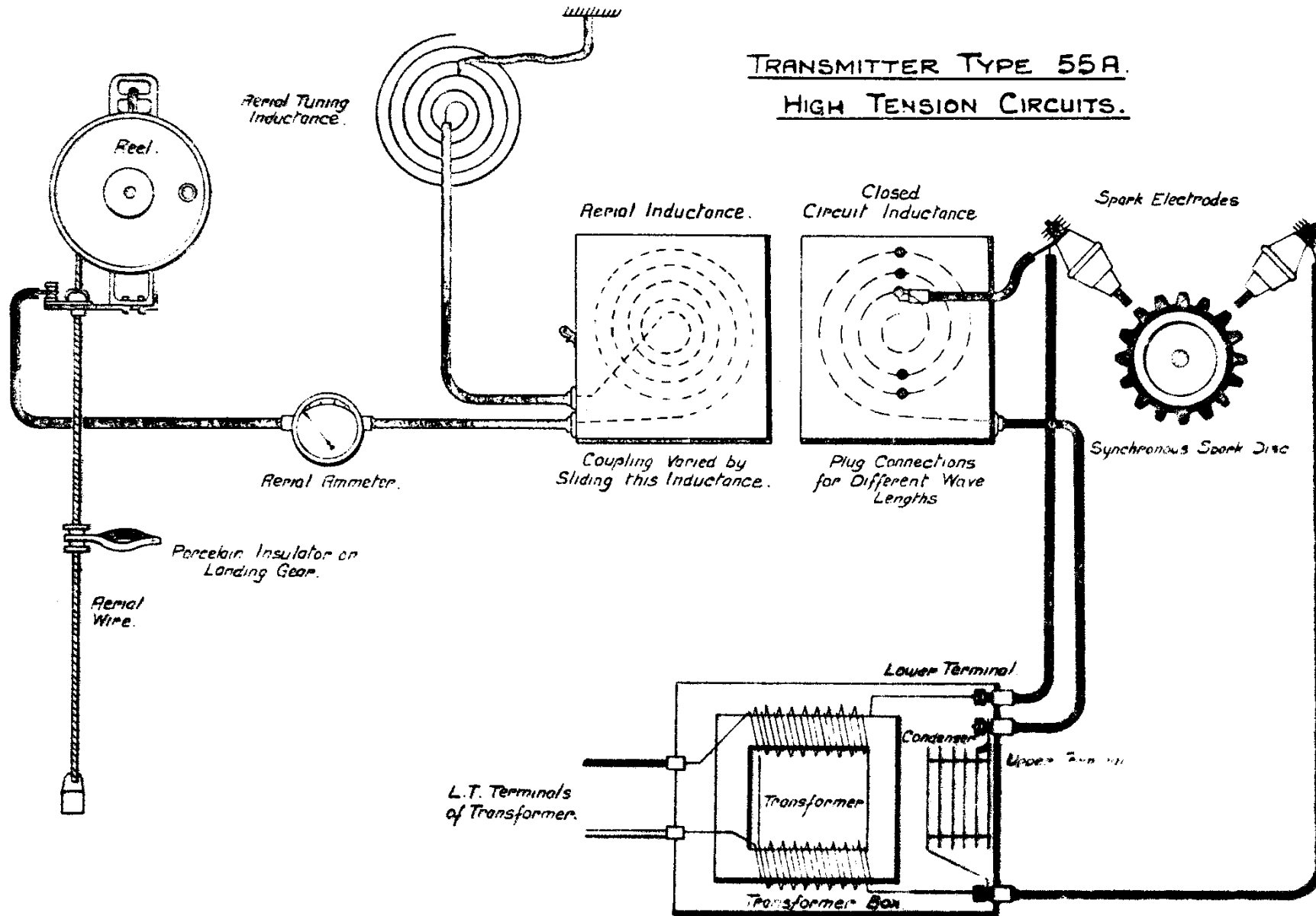


W.T. TRANSMITTER Type 52b





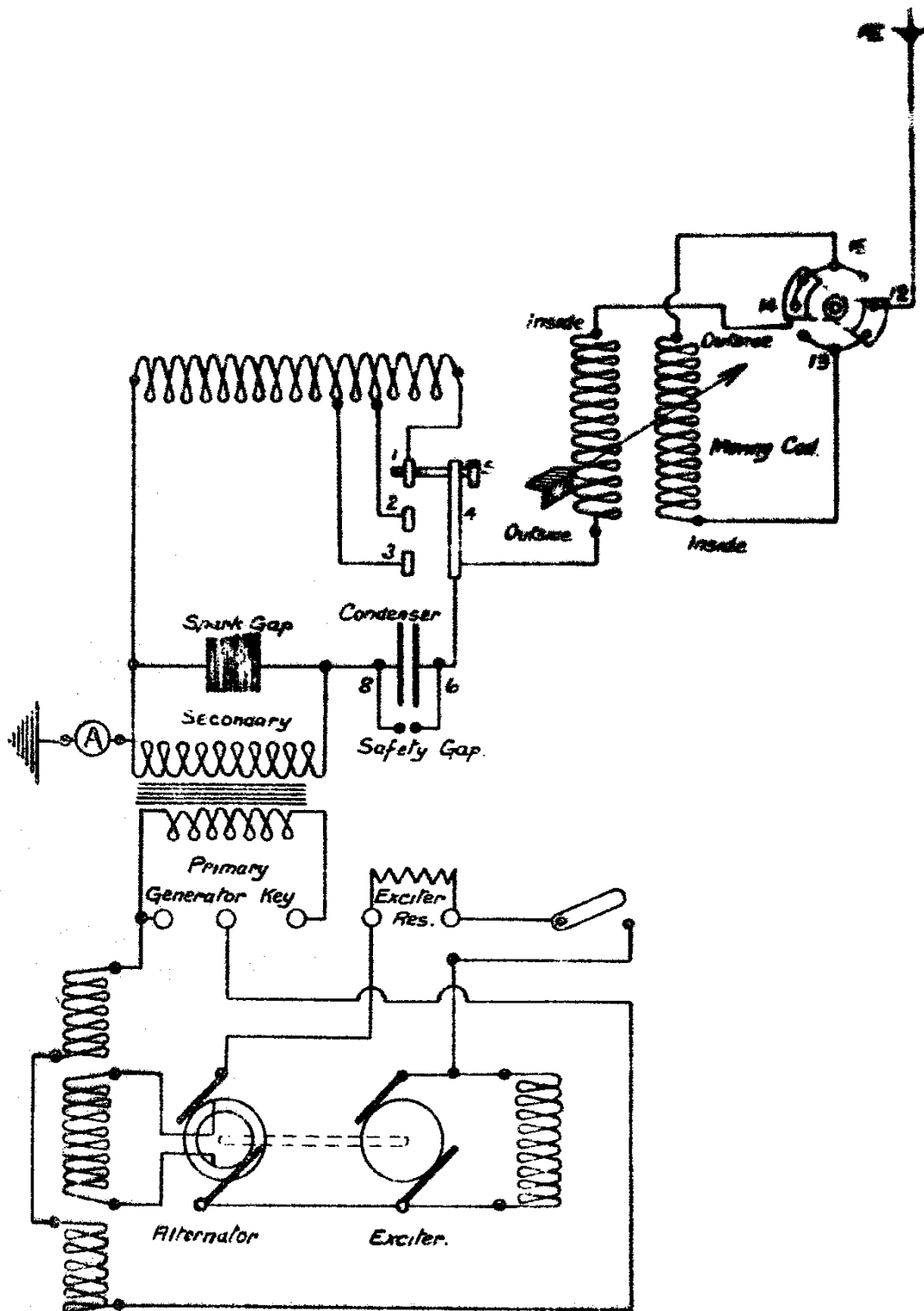
TRANSMITTER TYPE 55A. HIGH TENSION CIRCUITS.

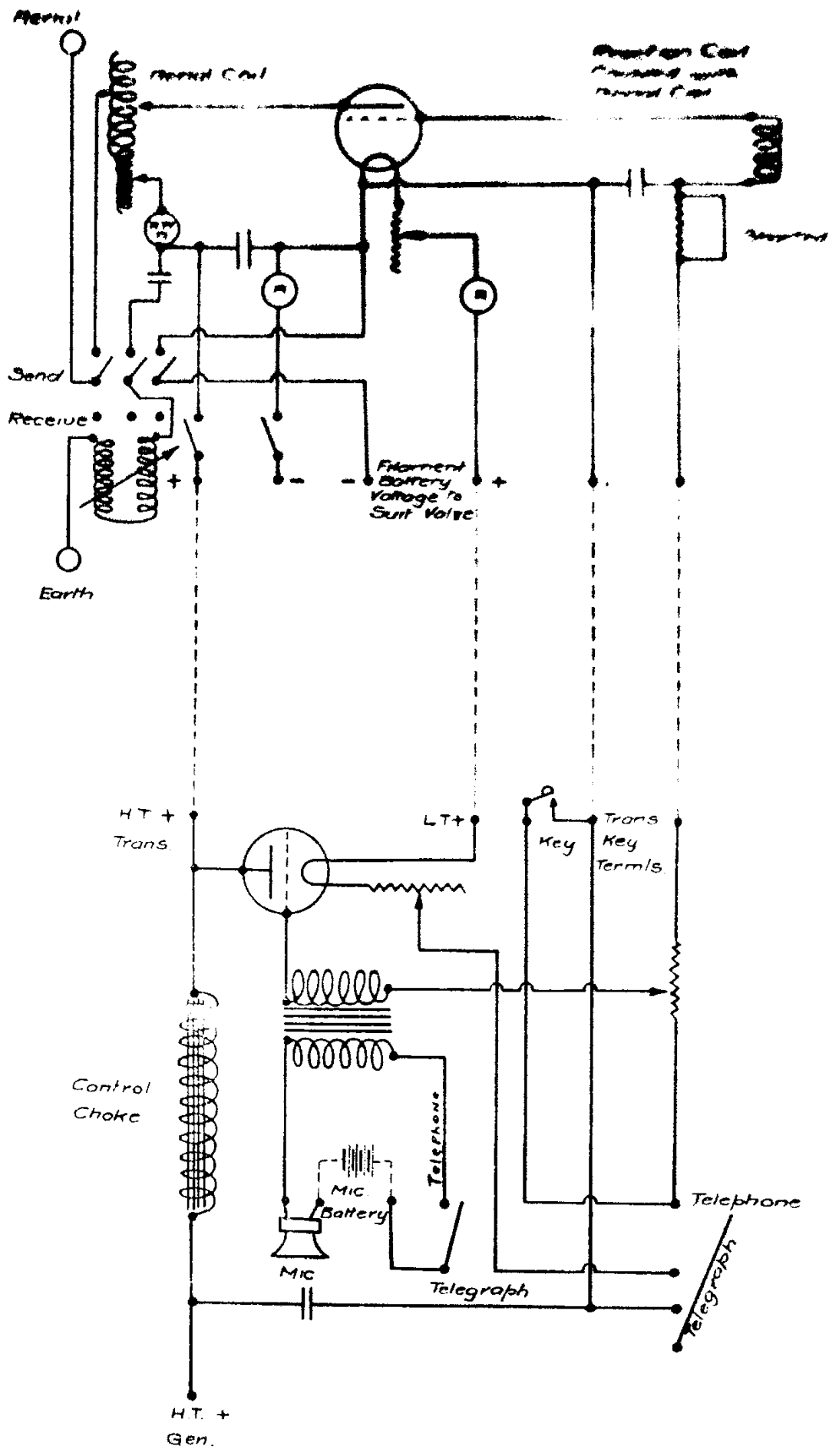


AIRCRAFT TRANSMITTER 500 WATTS QUENCHED SPARK

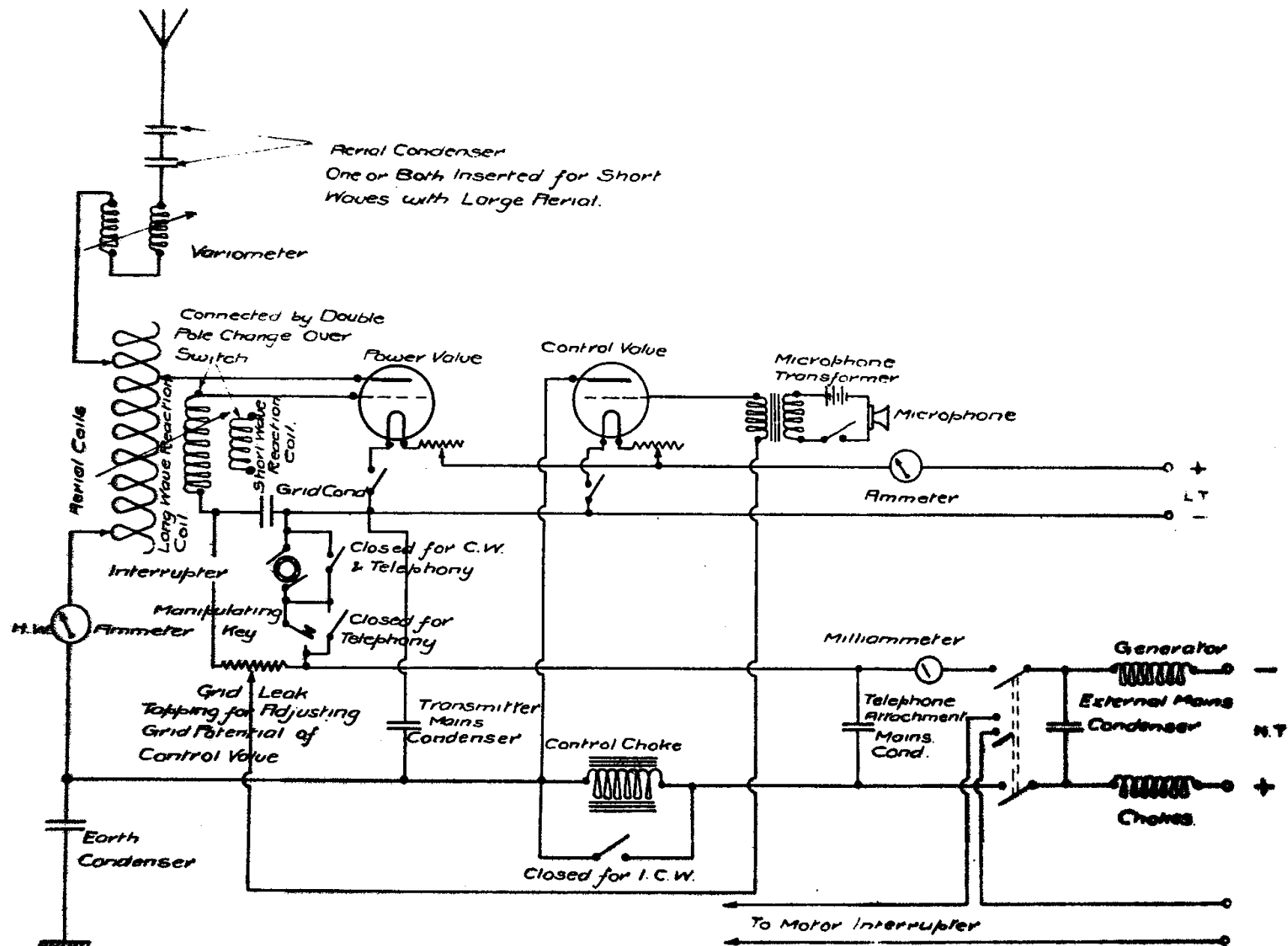
TRANSMITTER DIAGRAM

(PRACTICAL)



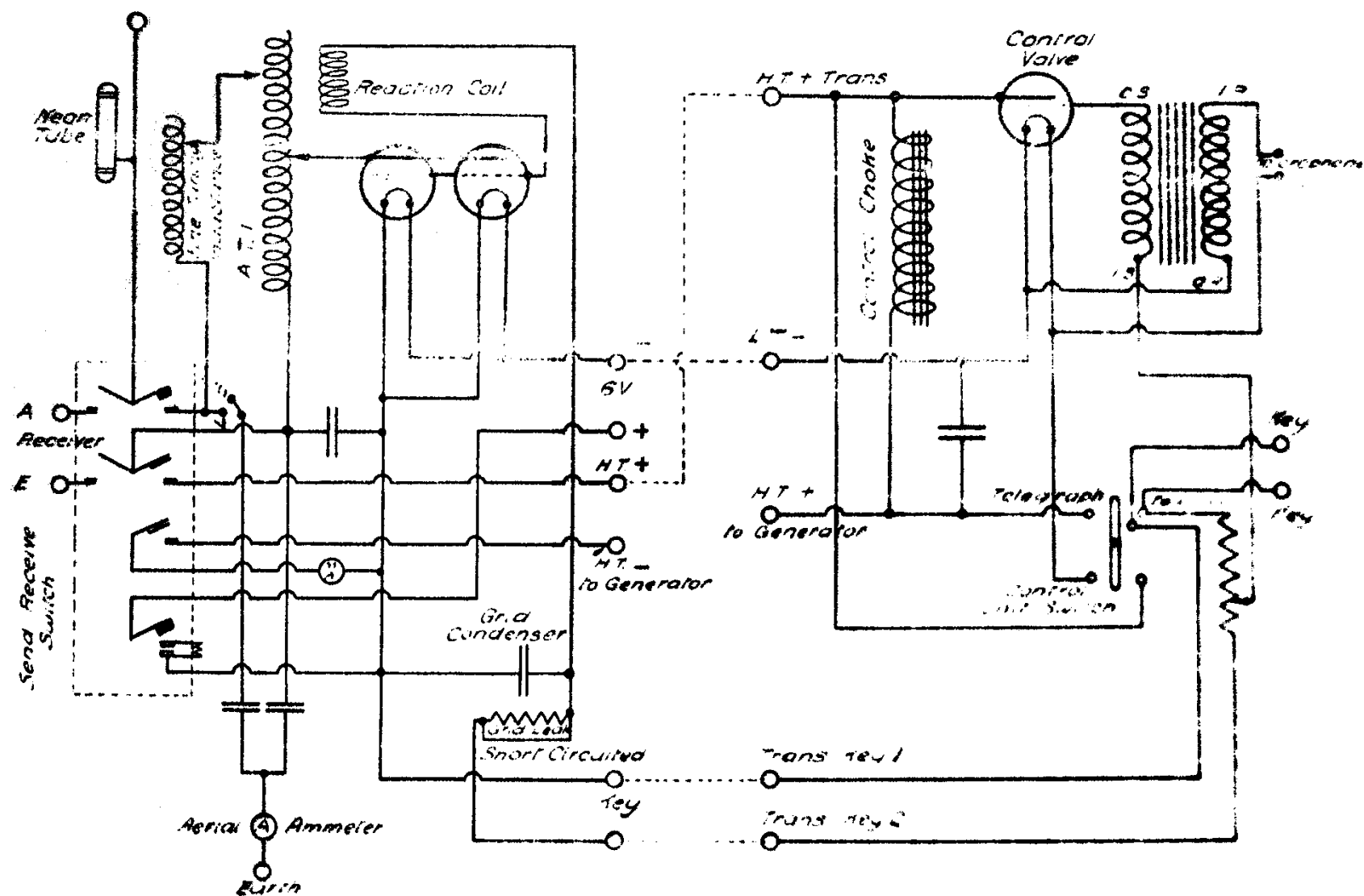


TRANSMITTER TY 'E 56B
WITH
TELEPHONE ATTACHMENT.



TRANSMITTER GROUND, TYPE T49.

DIAGRAM OF CONNECTIONS



TYPE 57CW TRANSMITTER WITH TELEGRAPH CONTROL

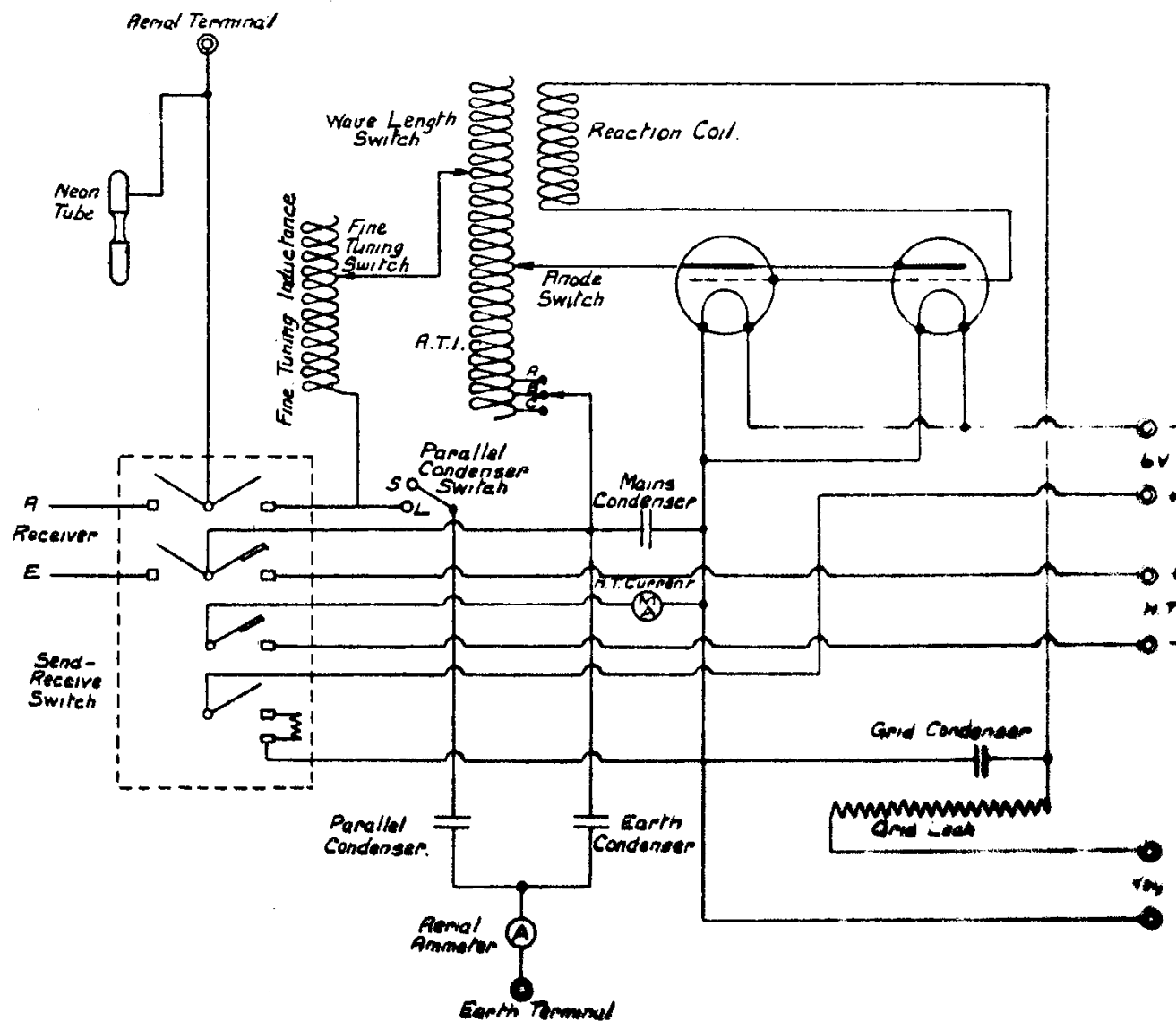
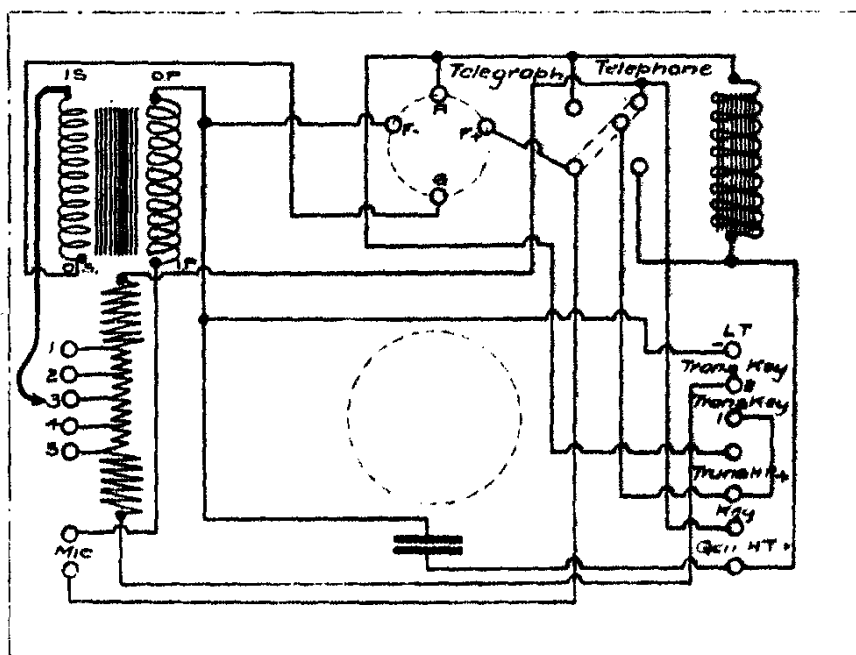


DIAGRAM OF CONNECTIONS OF TYPE T.21



ATTACHMENT TELEPHONE

TYPE T-24

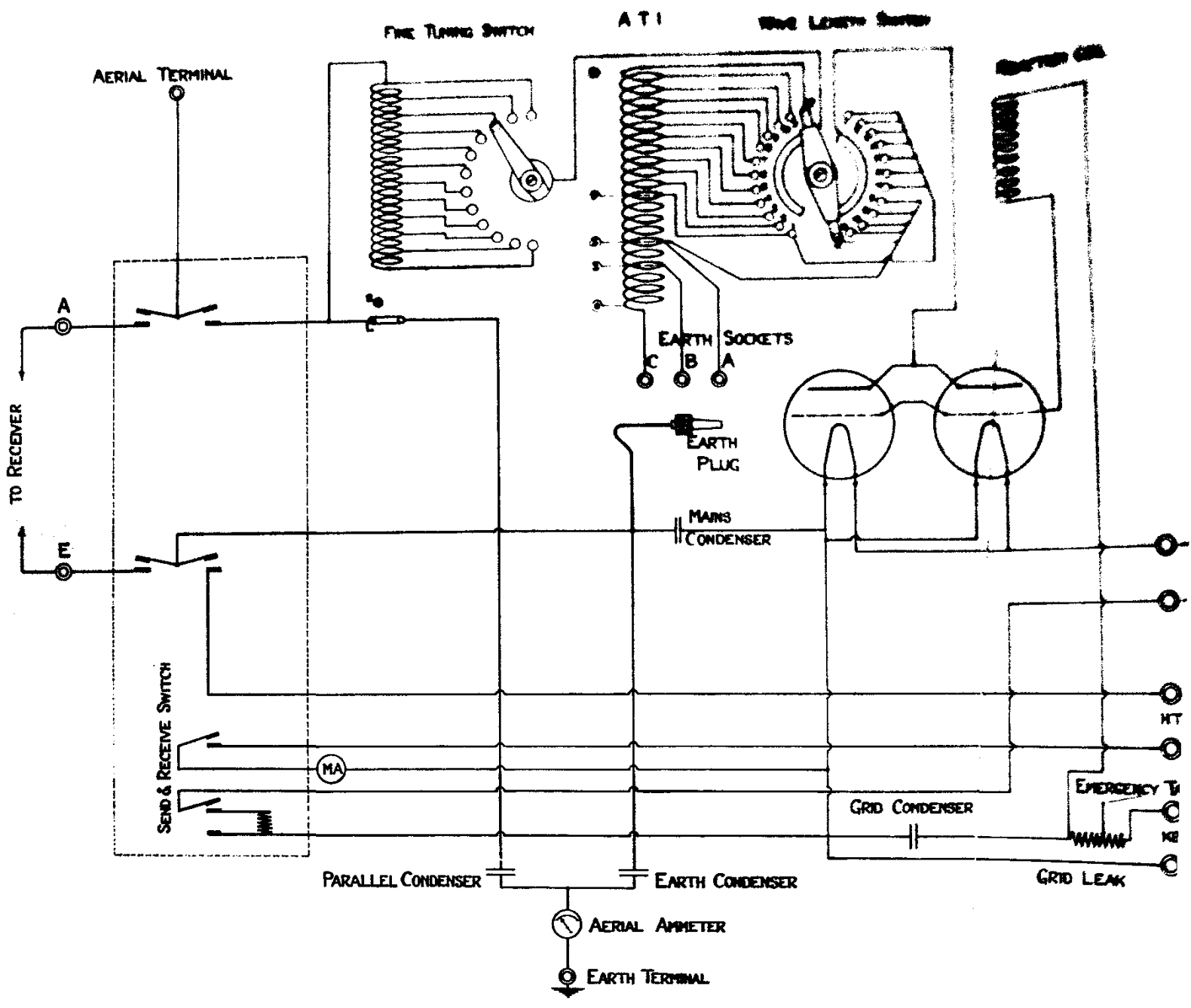
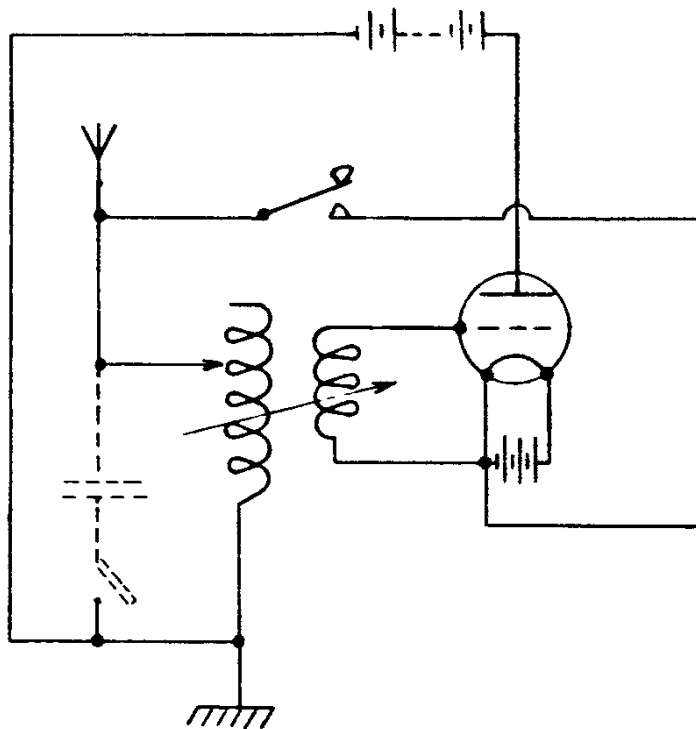


DIAGRAM OF CONNECTIONS OF TRANSMITTER TYPE 21A.

VALVE TRANSMITTER AIRCRAFT TYPE IV.

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TRANSMITTER DIAGRAM.



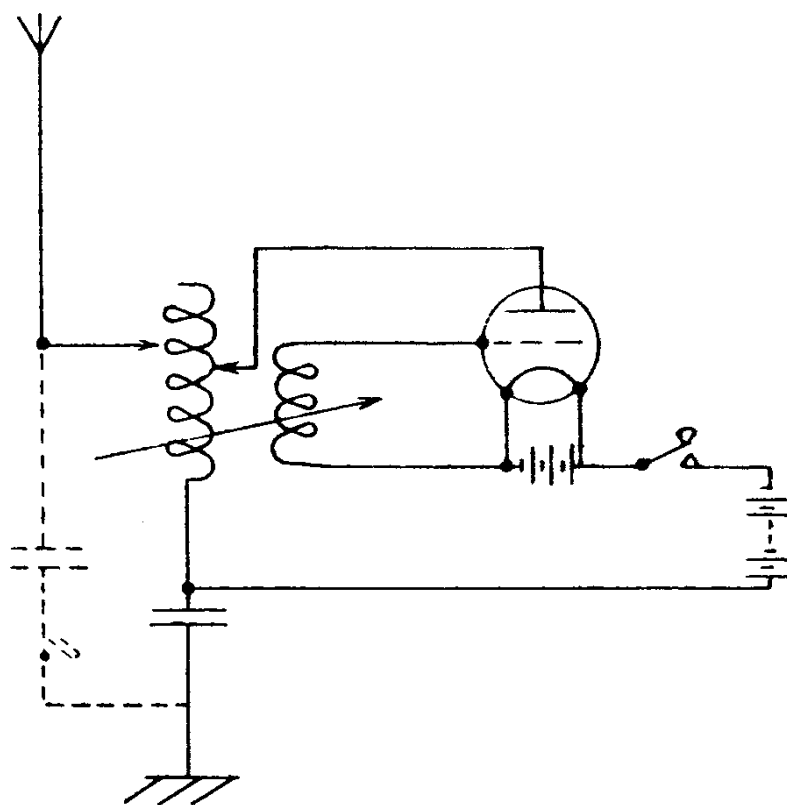
Note:-

First Six Instruments Only.

VALVE TRANSMITTER AIRCRAFT TYPE VI

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TRANSMITTER DIAGRAM



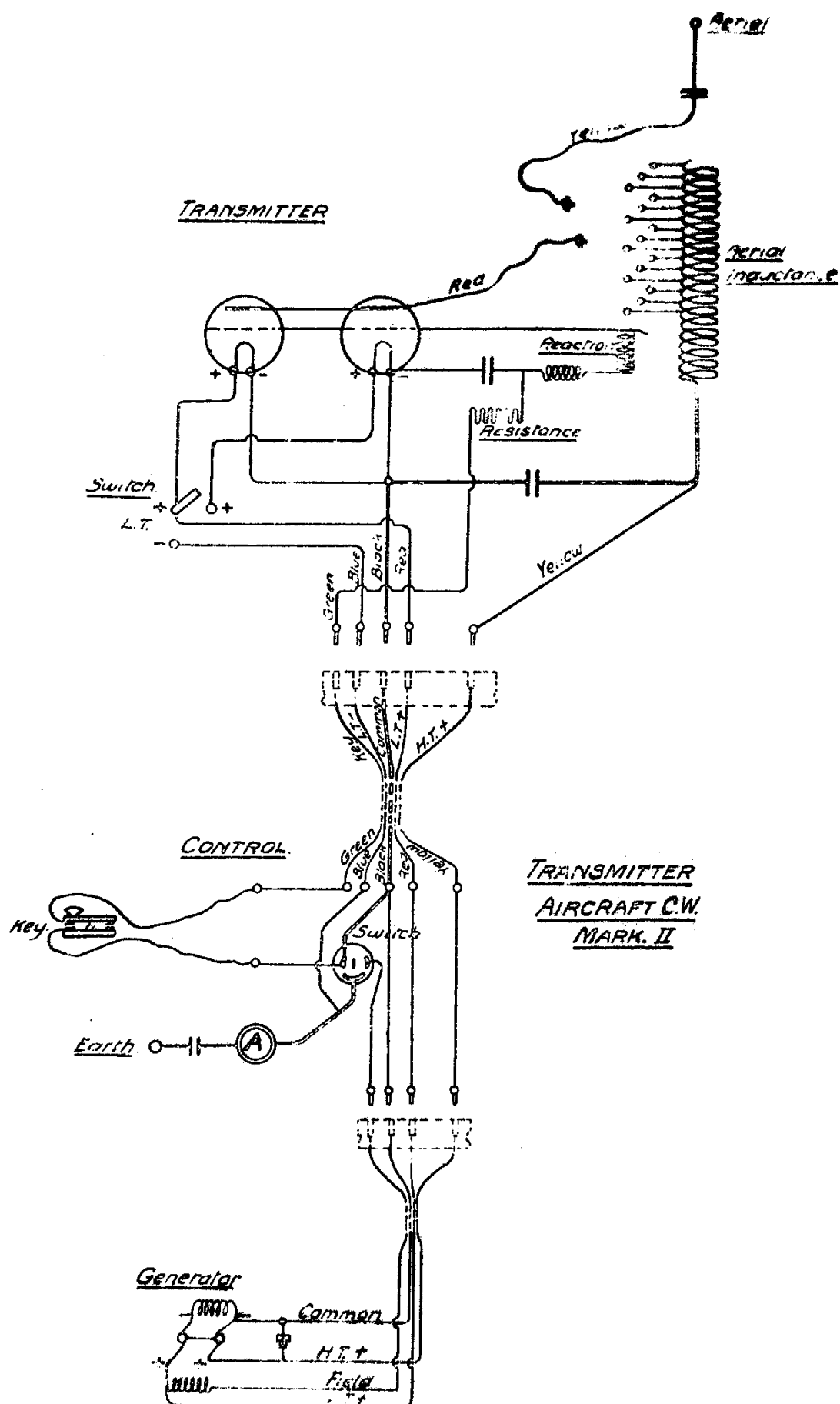
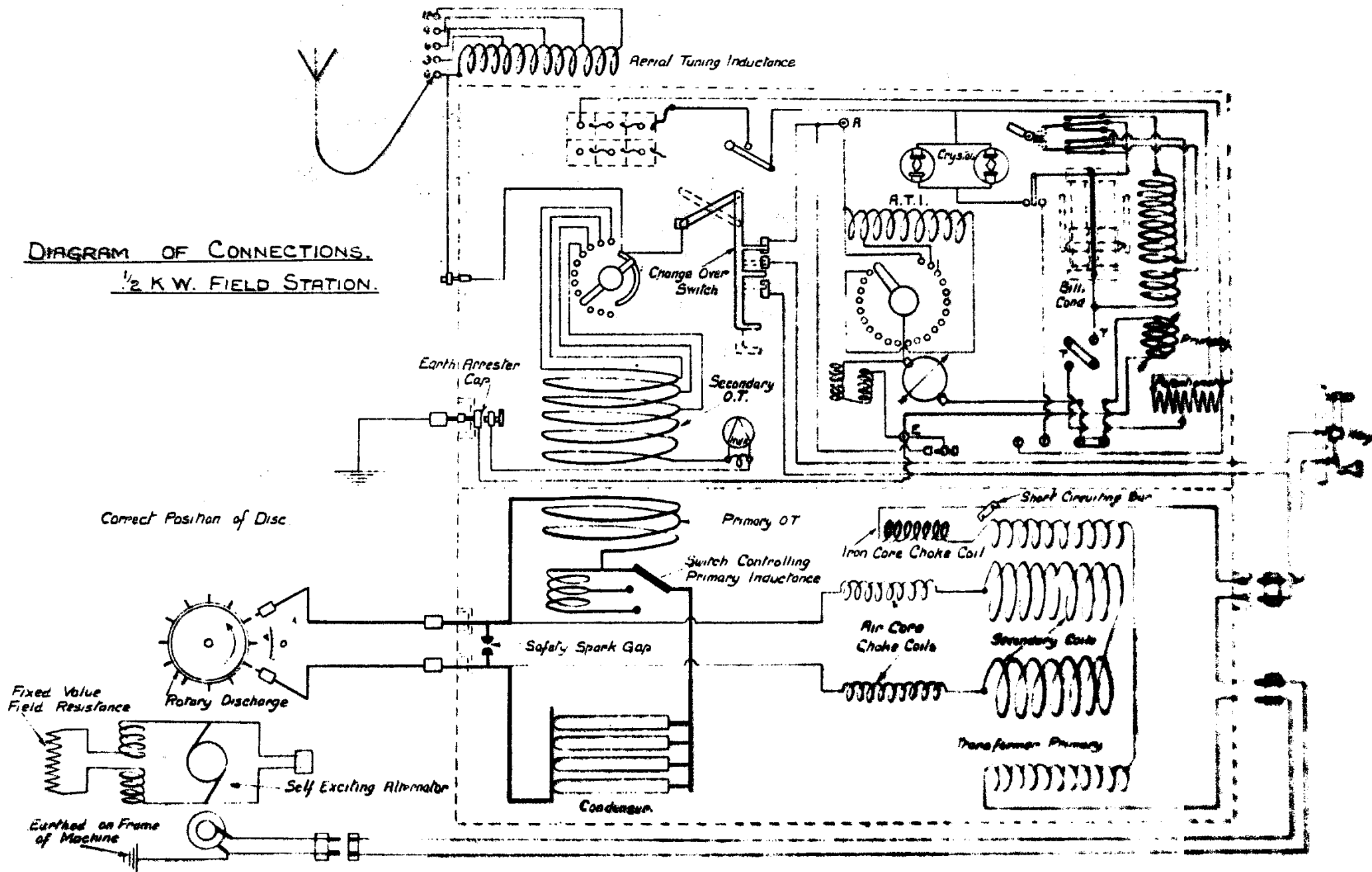
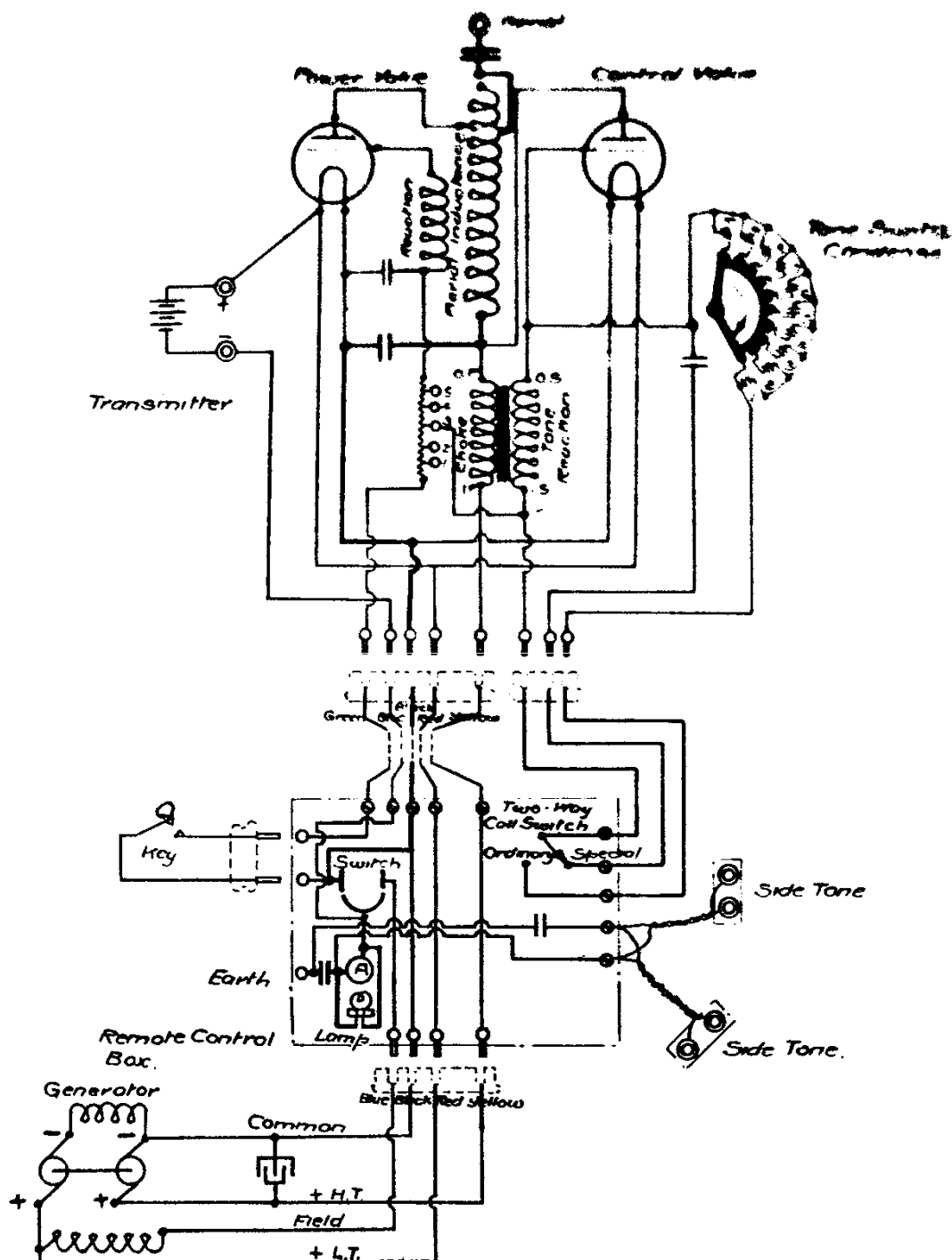


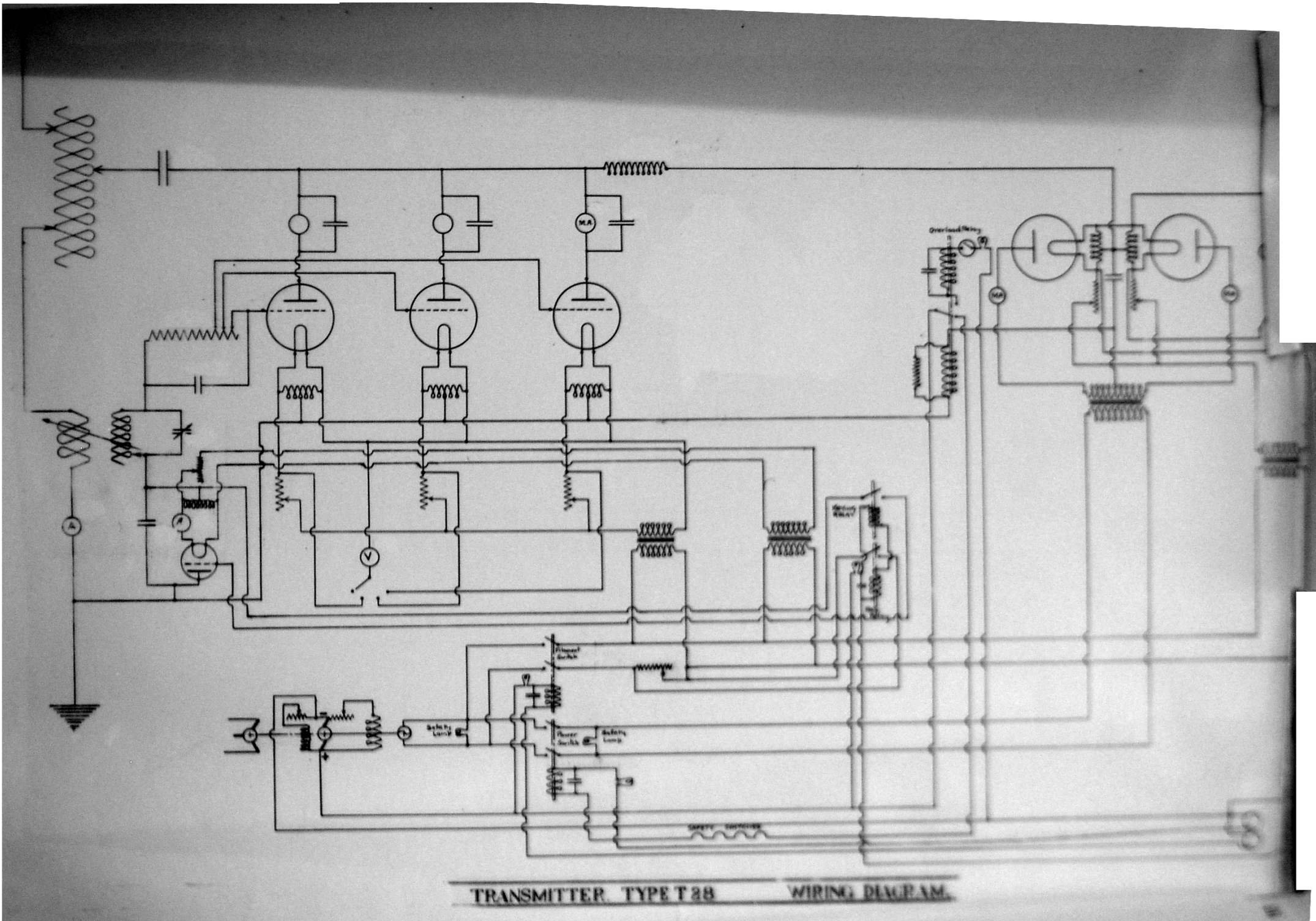
DIAGRAM OF CONNECTIONS.
1/2 K.W. FIELD STATION.

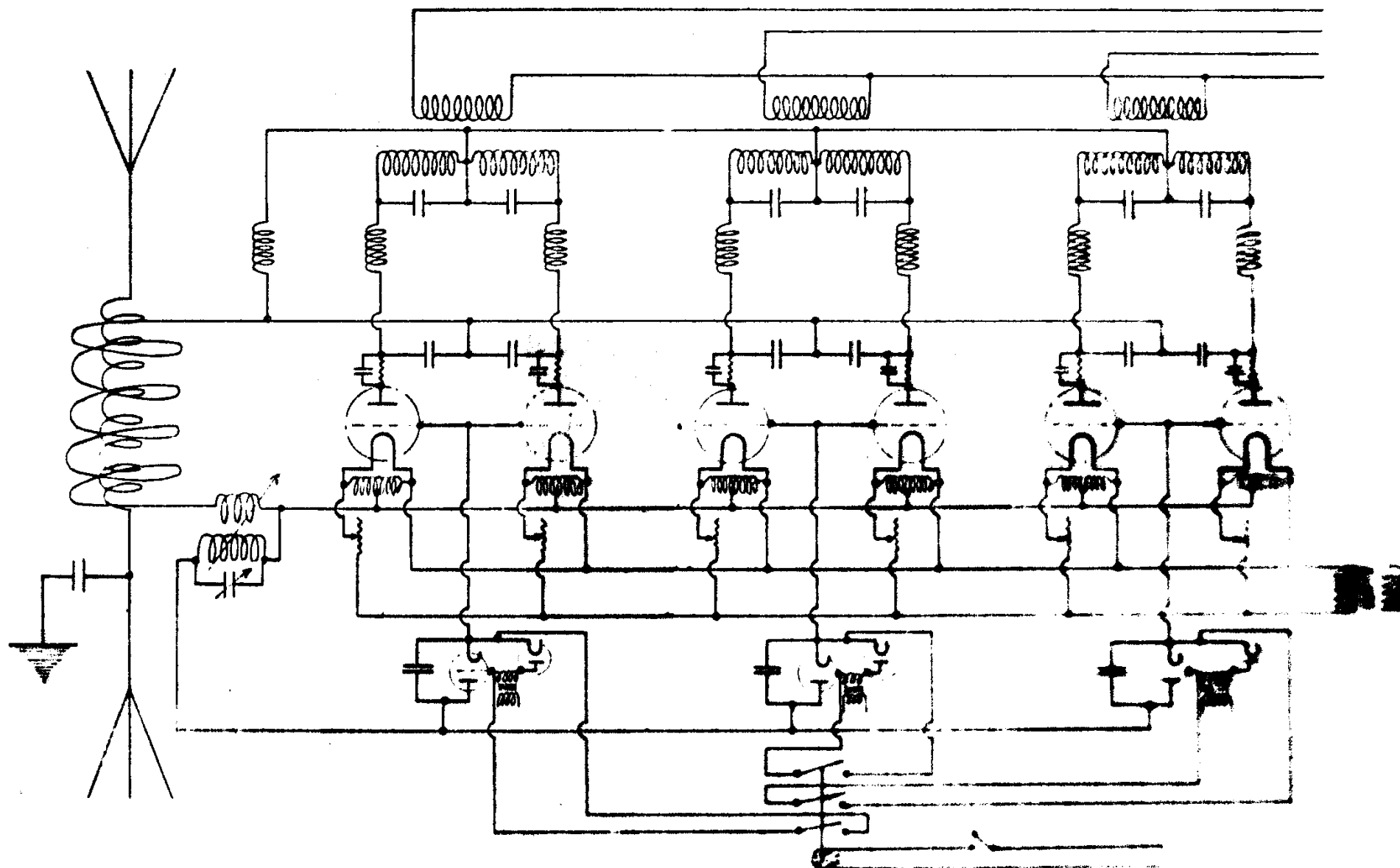




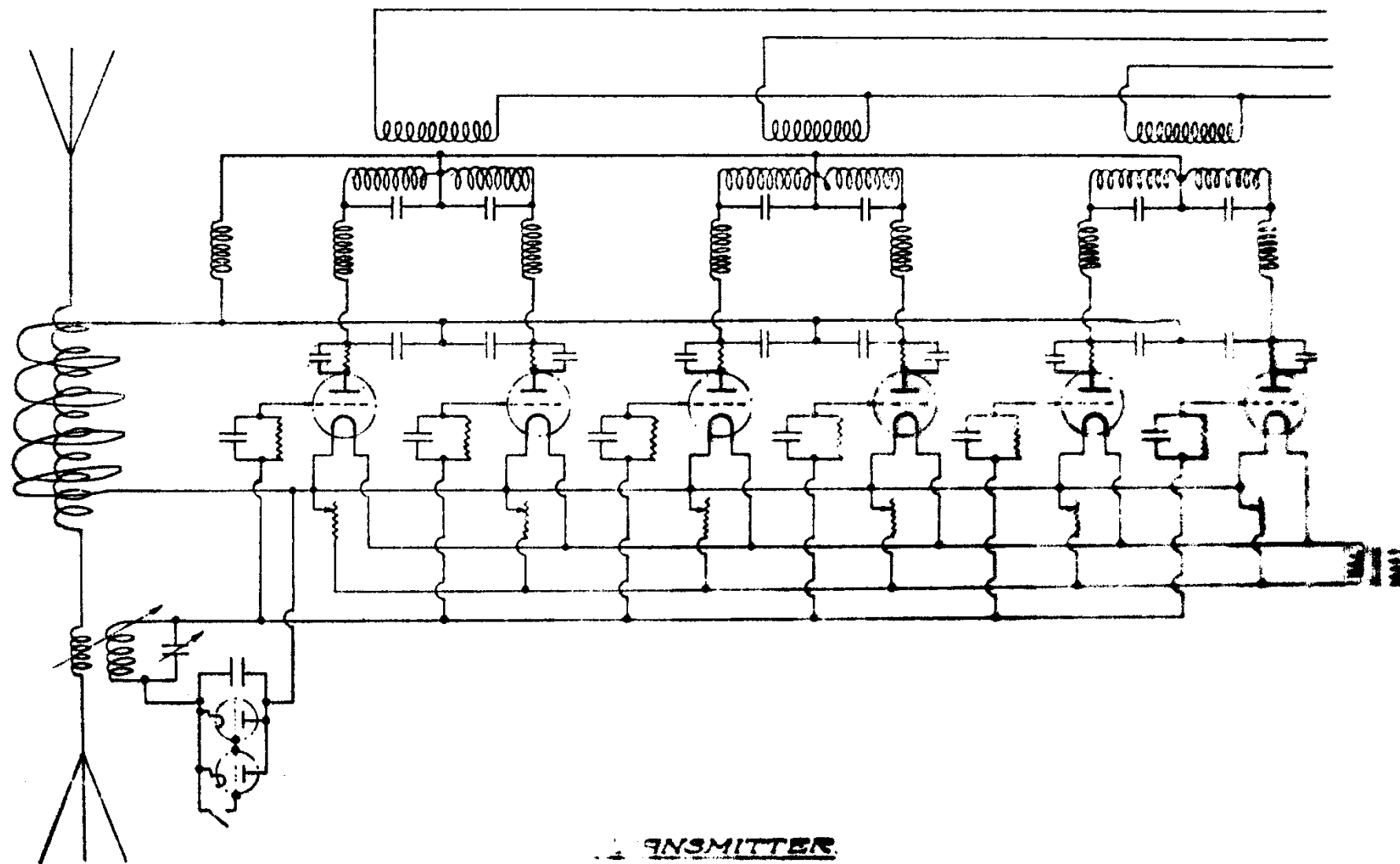
TRANSMITTER TYPE T.23.

DIAGRAM OF CONNECTIONS





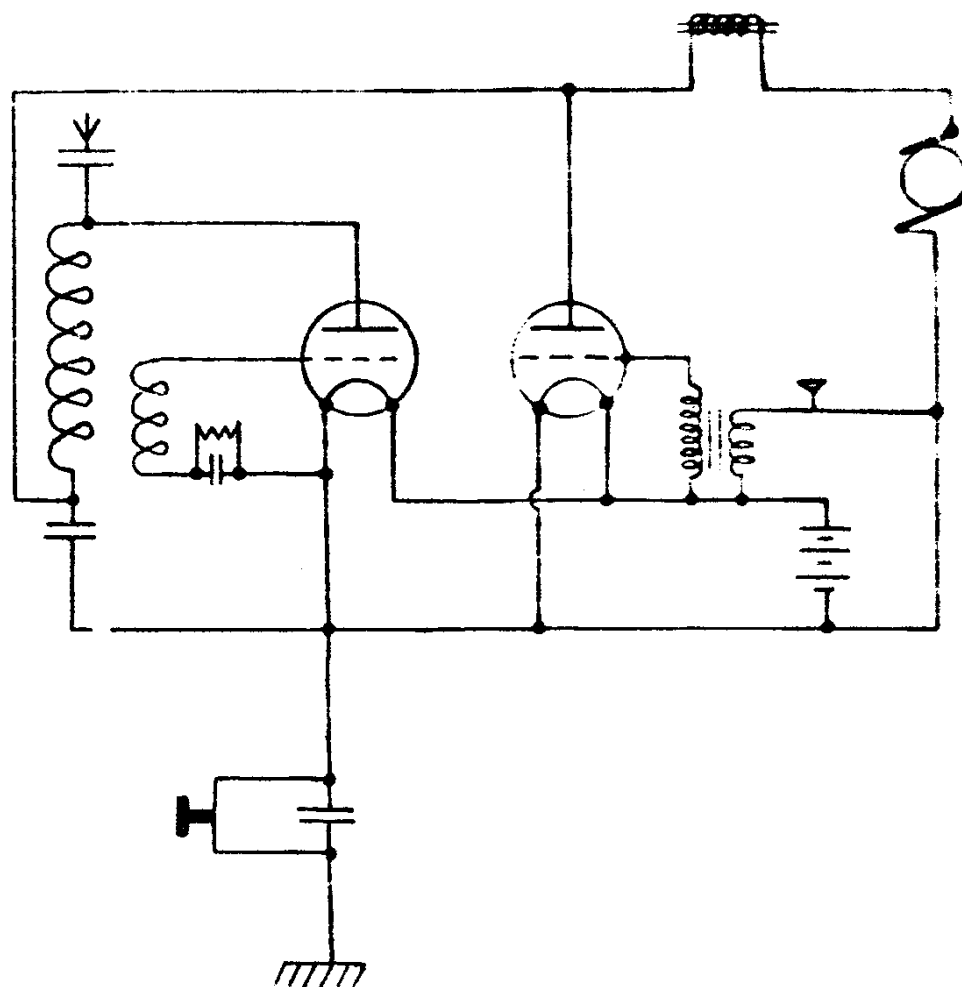
TRANSMITTER TYPE T K.
EARLY FORM OF CIRCUIT

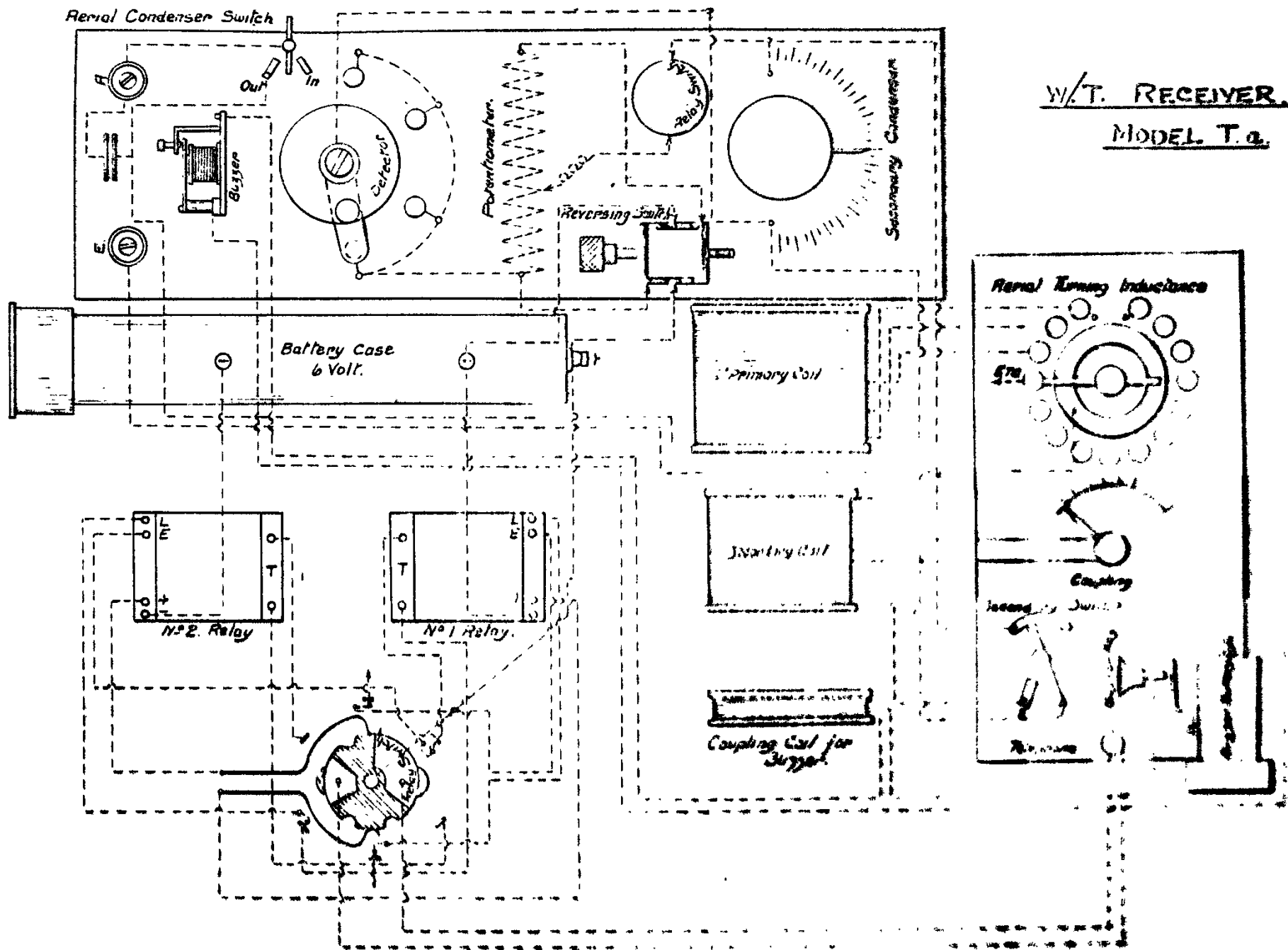


9NSMITTER
TYPE T30

TRANSMITTER TELEPHONE WIRELESS: AIRCRAFT

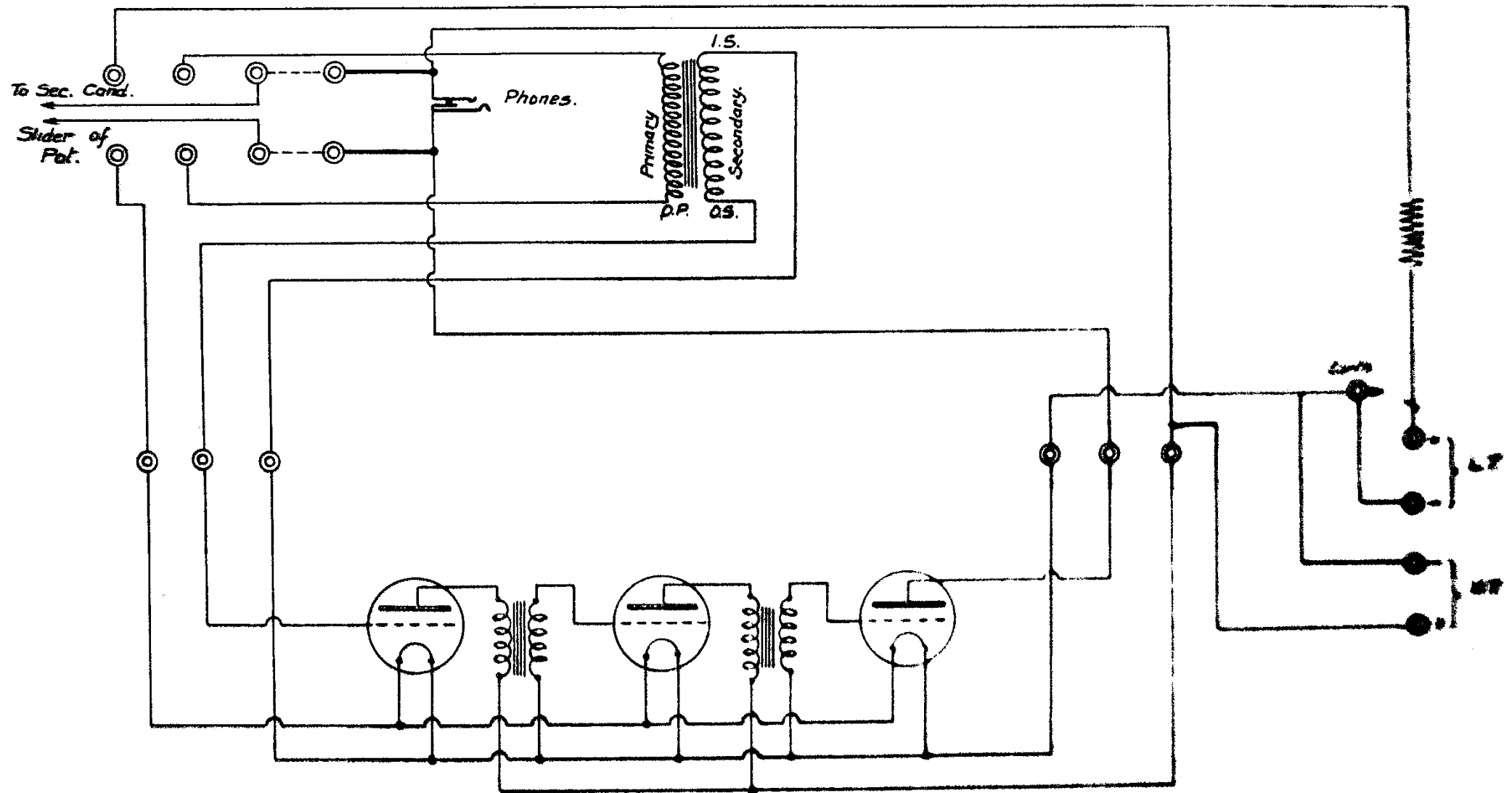
MARK II (RT. M. II) (THEORETICAL)





T. A. TRIPLE VALVE AMPLIFIER.

DIAGRAM OF CONNECTIONS.



W/T. RECEIVING SET MODEL Tb.

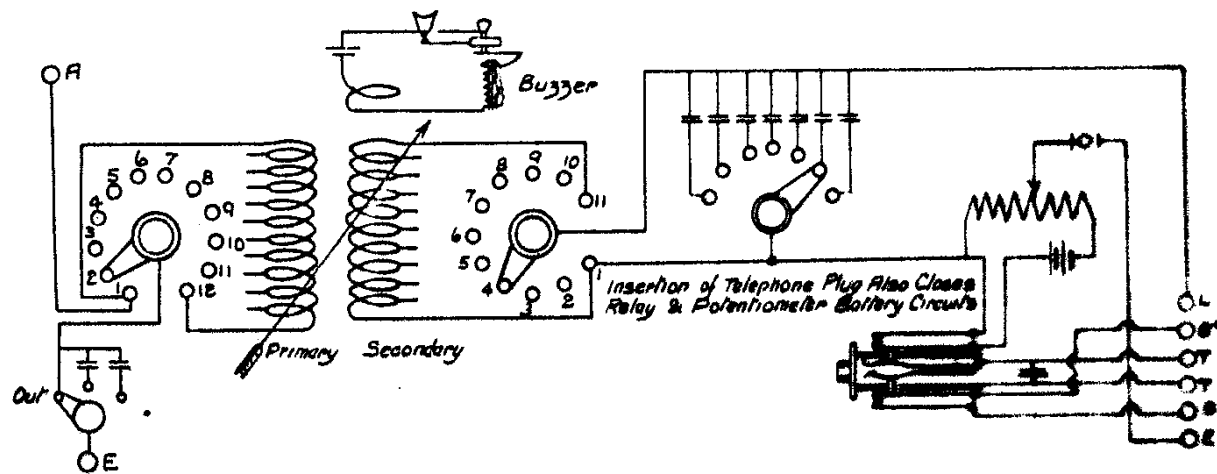
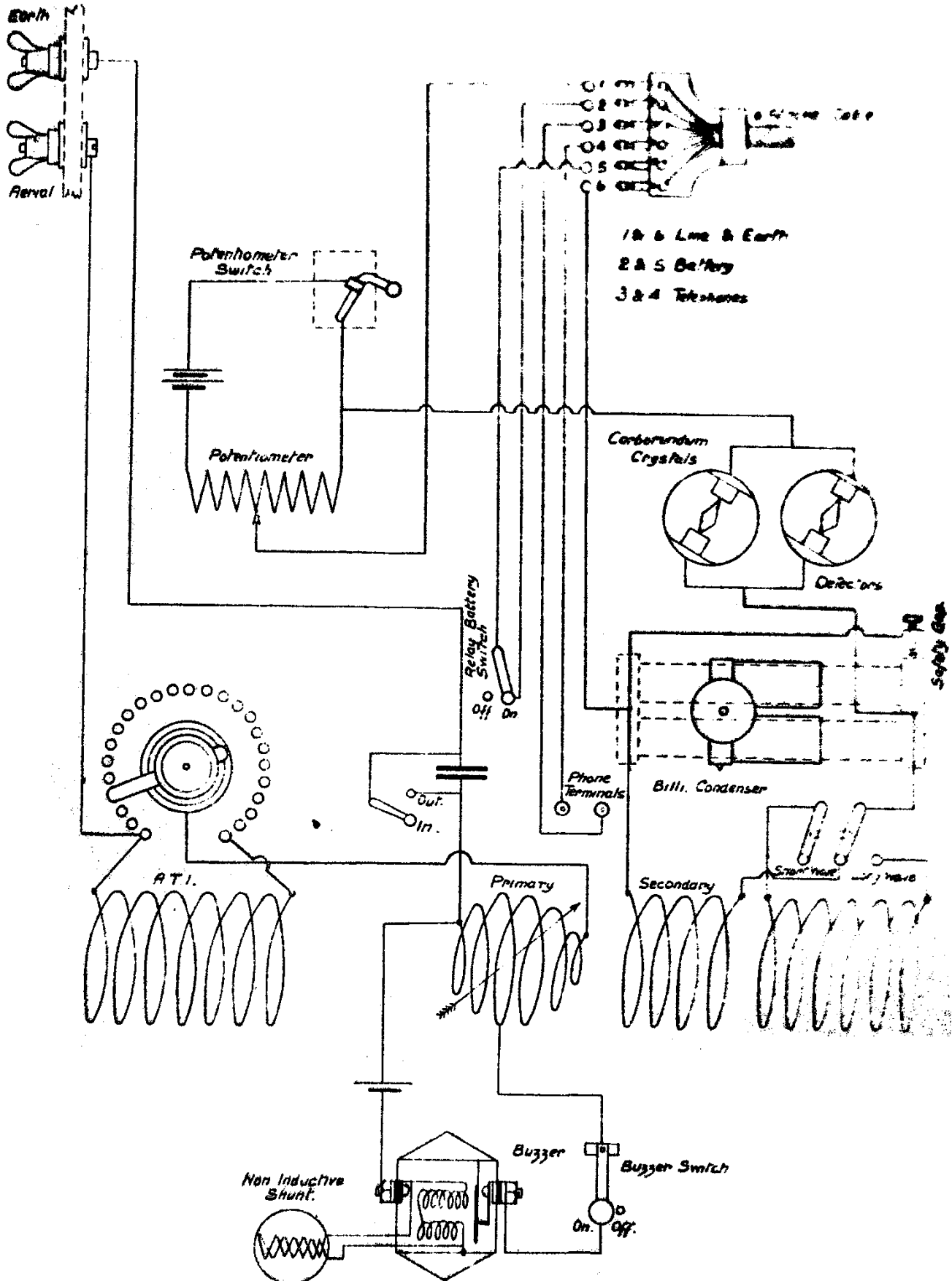
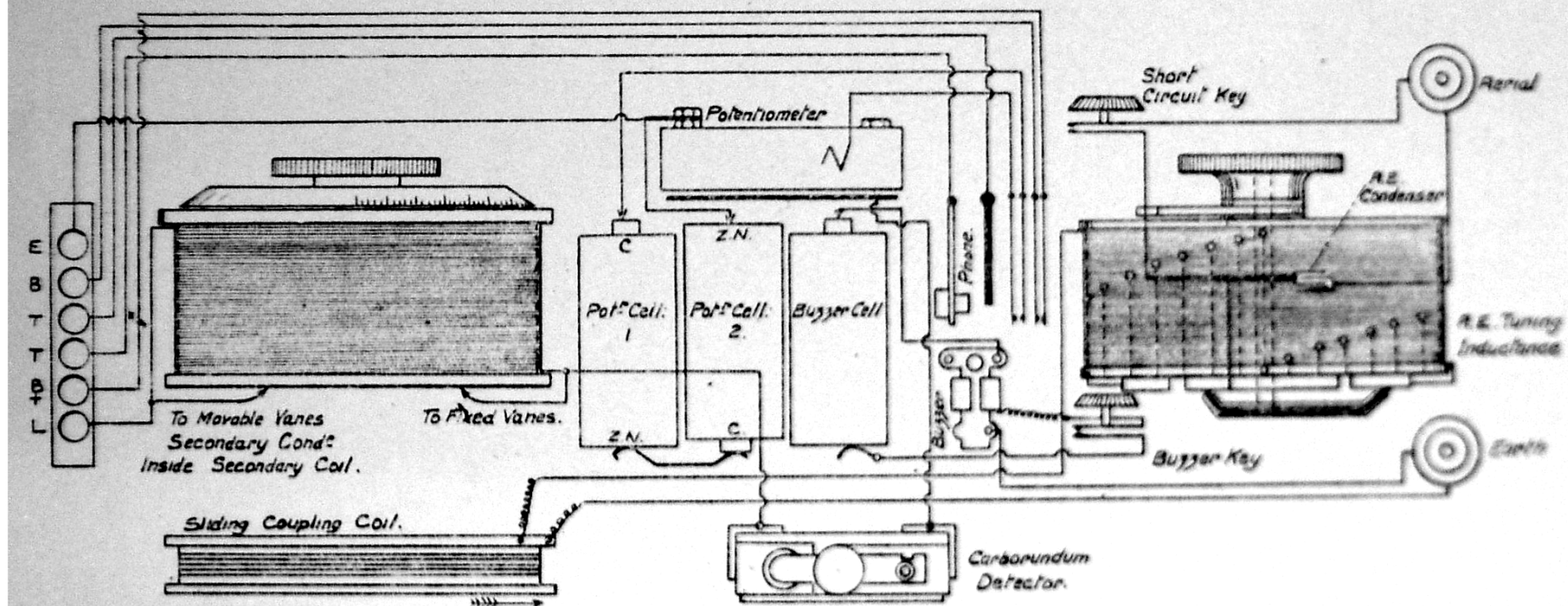


DIAGRAM OF CONNECTIONS WT RECEIVER MODEL TC.

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W/T RECEIVER. MODEL T.D.



CONNECTIONS FOR T.E. RECEIVER.

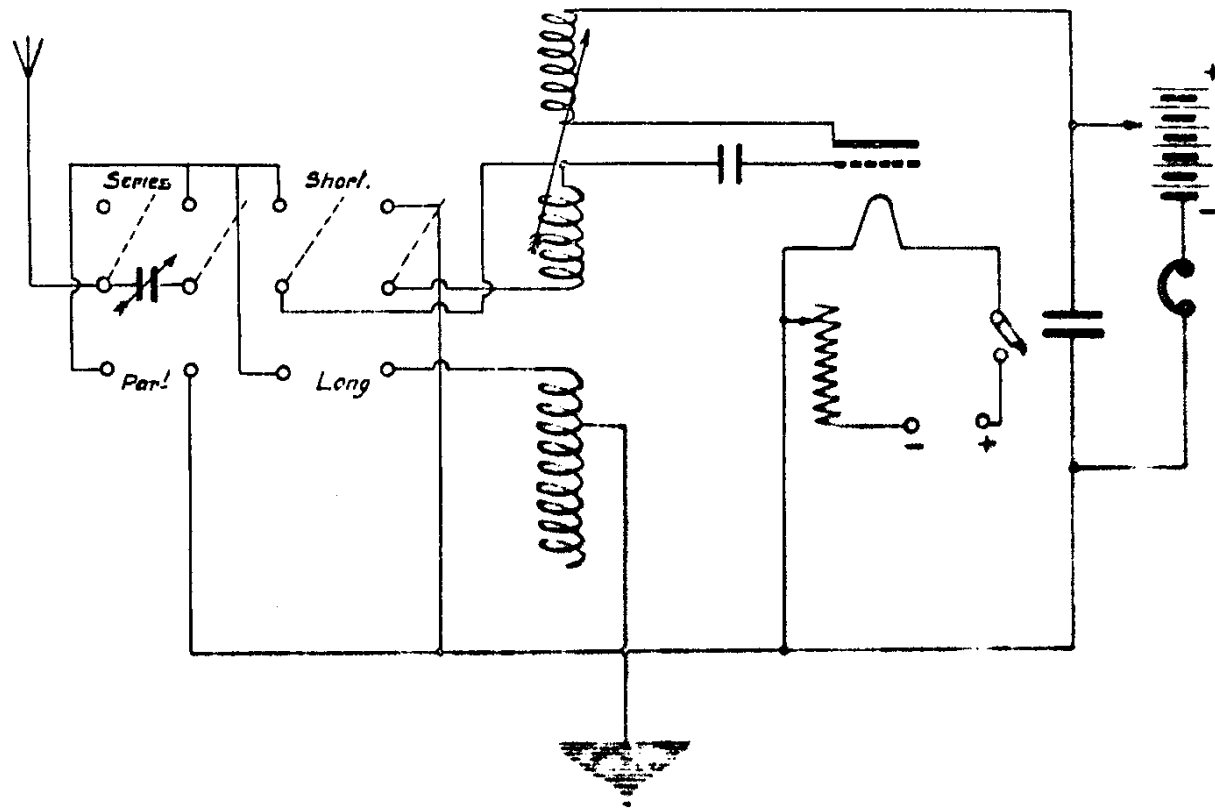
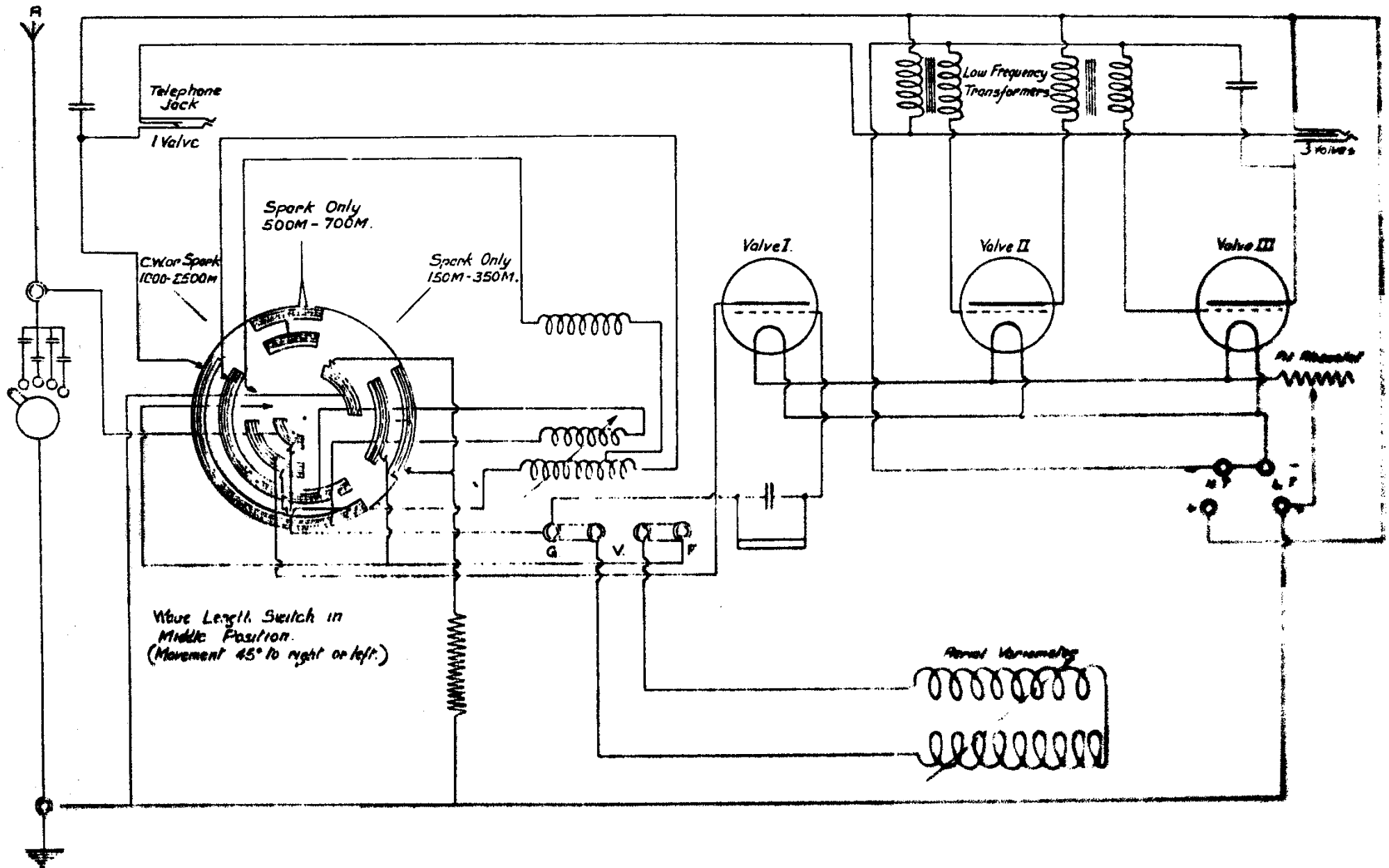
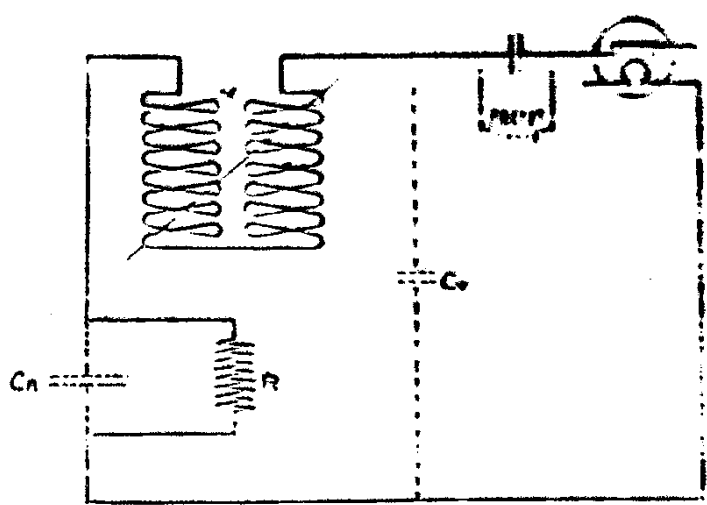


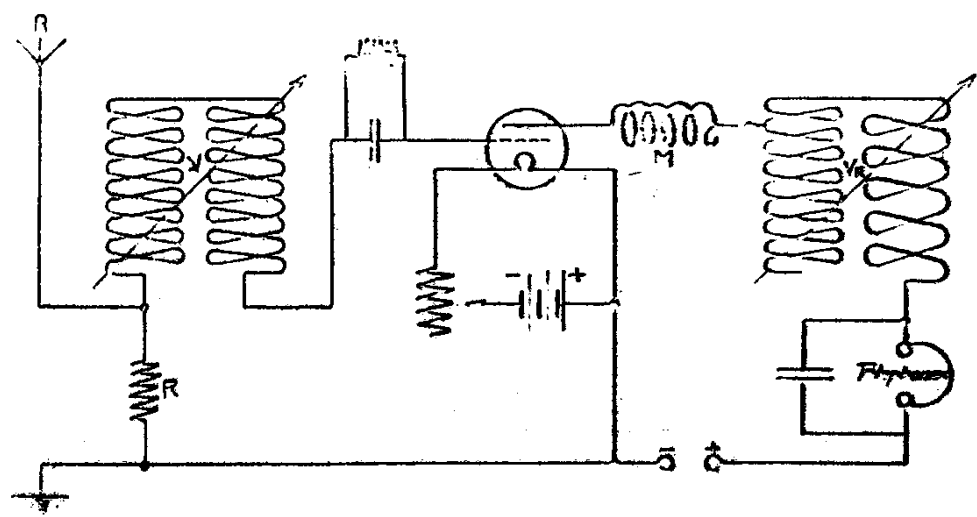
DIAGRAM OF CONNECTIONS. RECEIVER TYPE T.F.



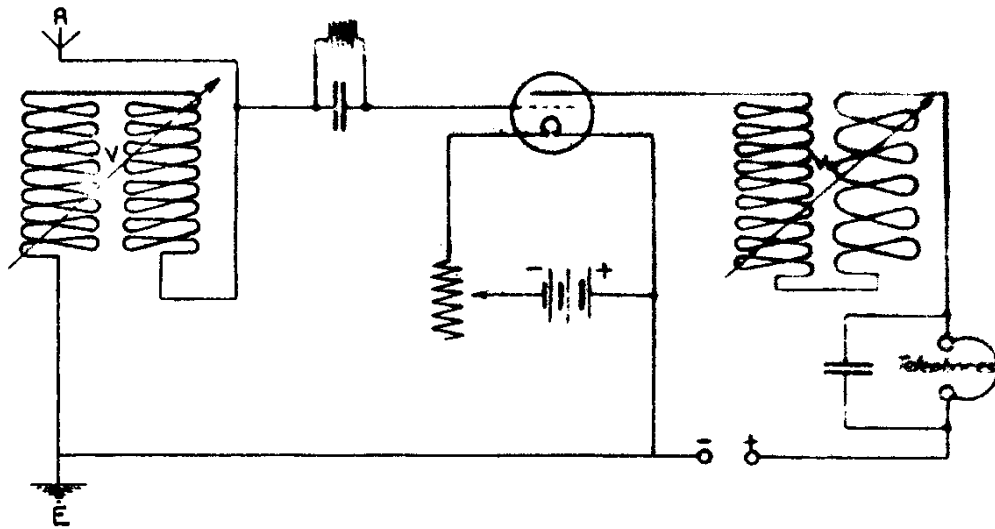
PRINCIPLE OF TUNING ON 150-350 METRE RANGE



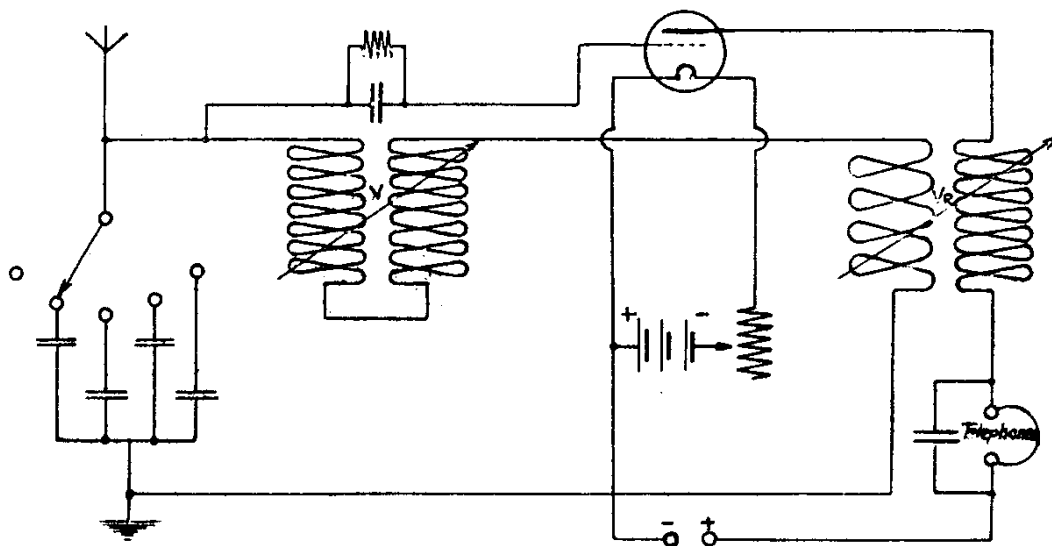
150-350 METRE RANGE USING 125 VALVE ONLY.



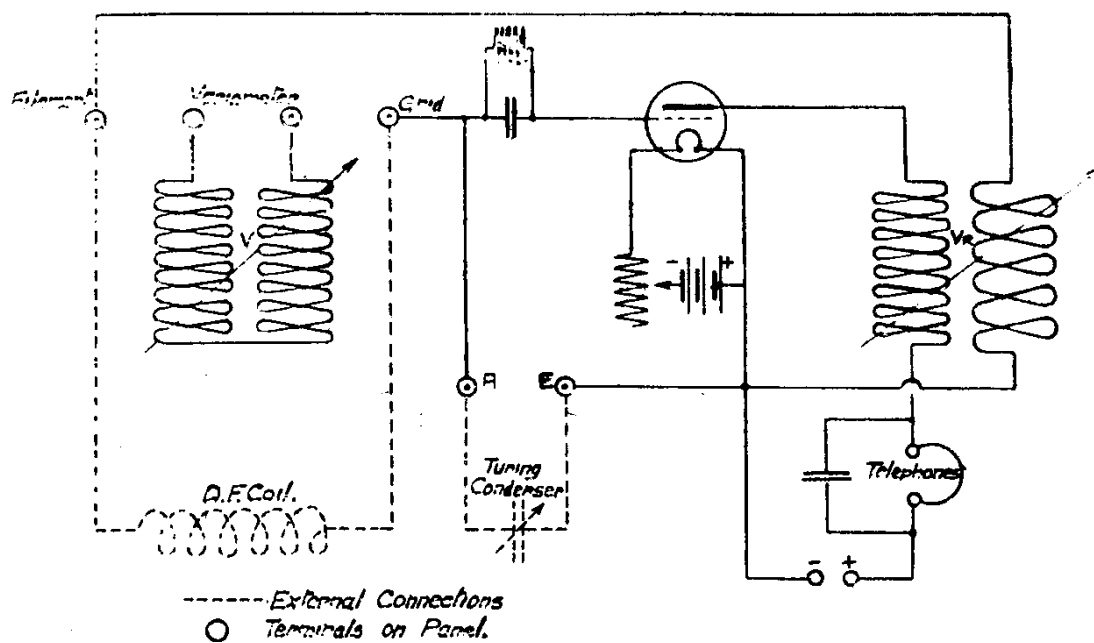
500 - 700 METRE RANGE USING 1ST VALVE ONLY.



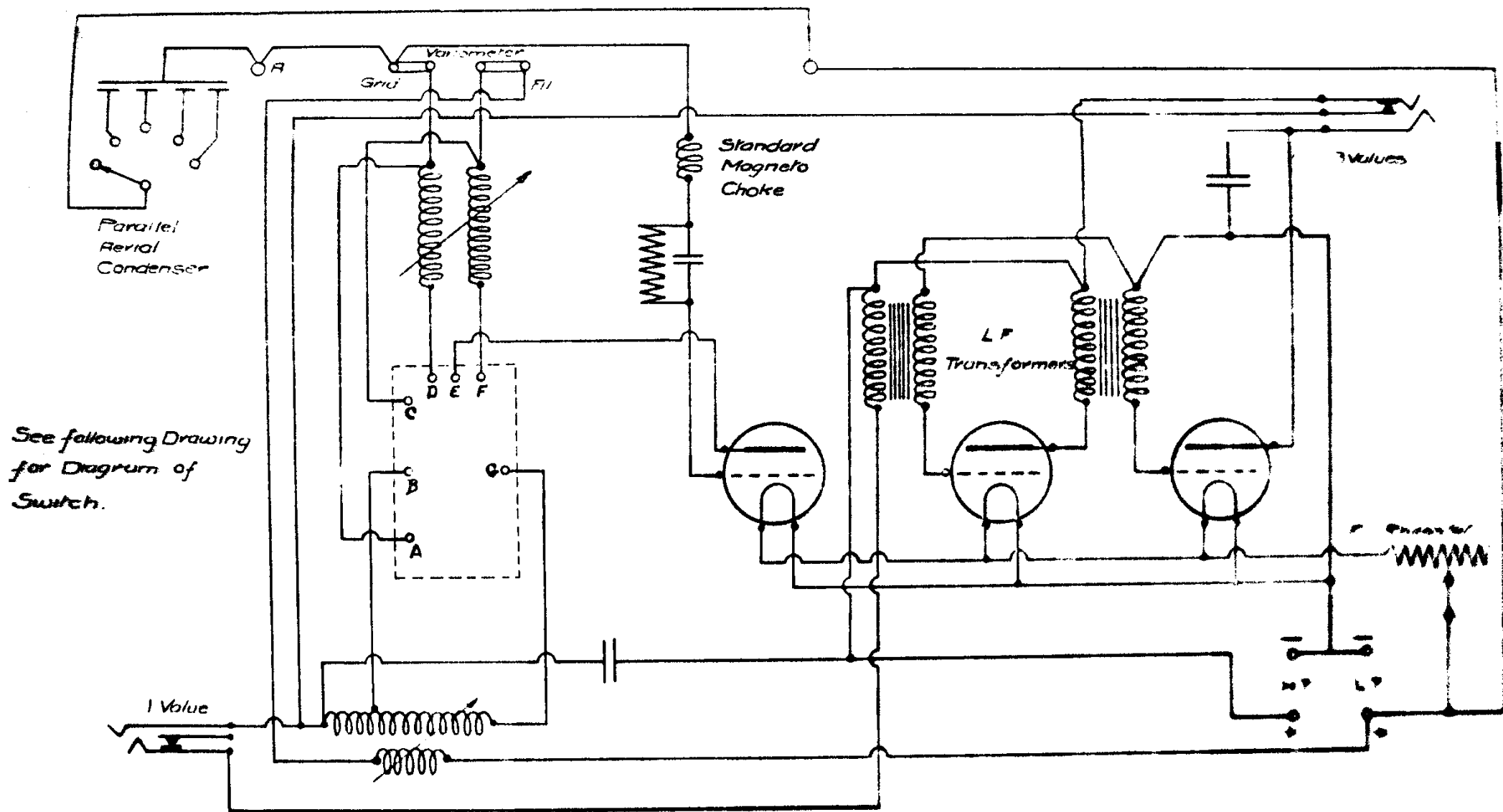
1000 - 2500 METRE RANGE USING 1ST VALVE ONLY.



TE. RECEIVER ADAPTED FOR DIRECTION FINDING. USING 1ST VALVE ONLY.

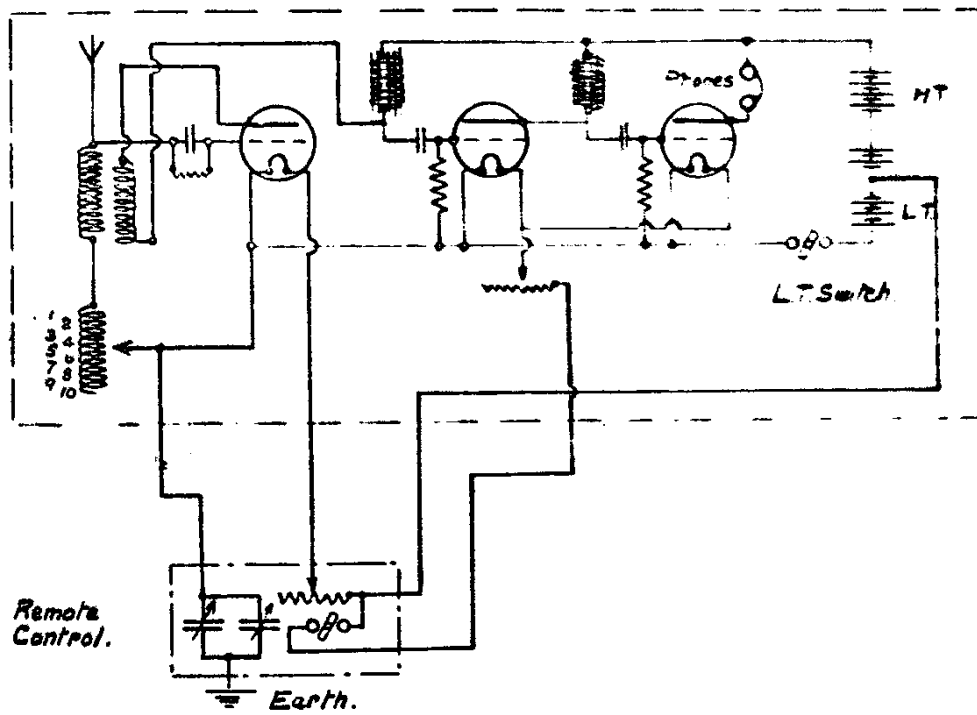


SELECTIVE ATTACHMENT FOR TF RECEIVER



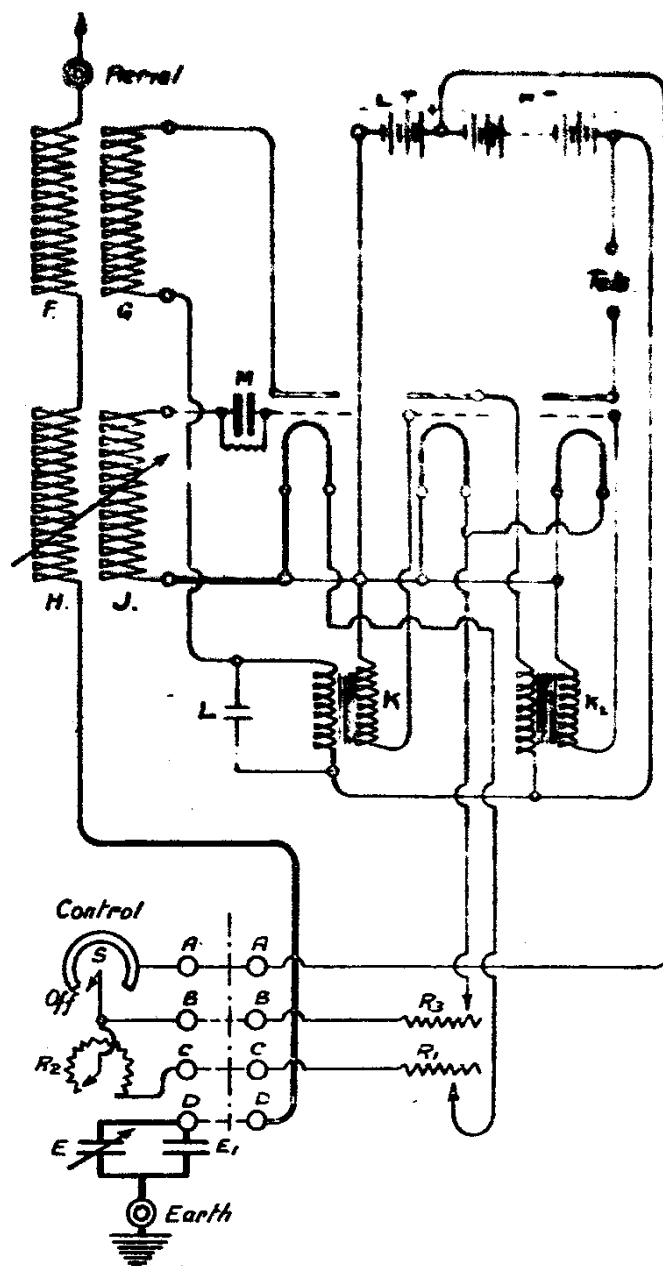
RECEIVER AIRCRAFT WALKER

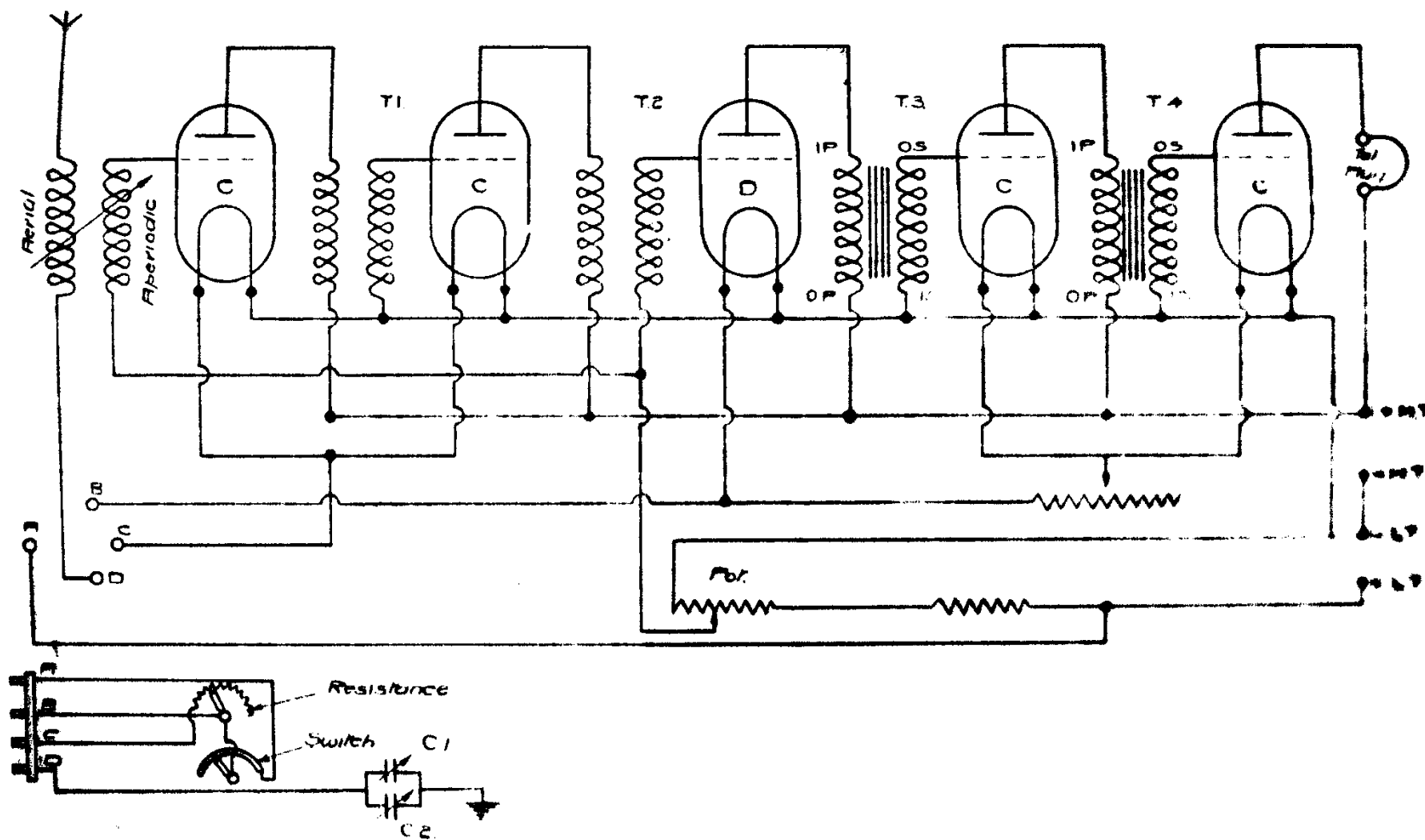
42



TUNER AIRCRAFT MARK III.

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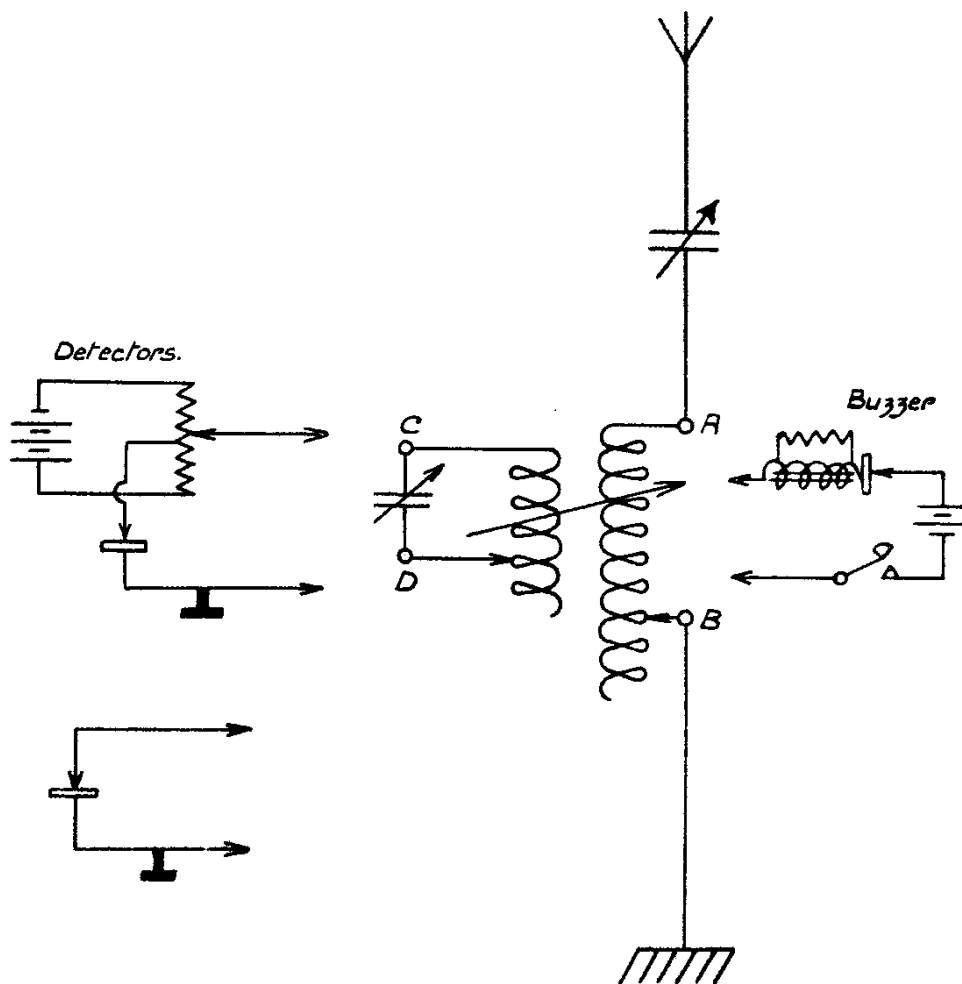




TUNER
RAE TYPE 12

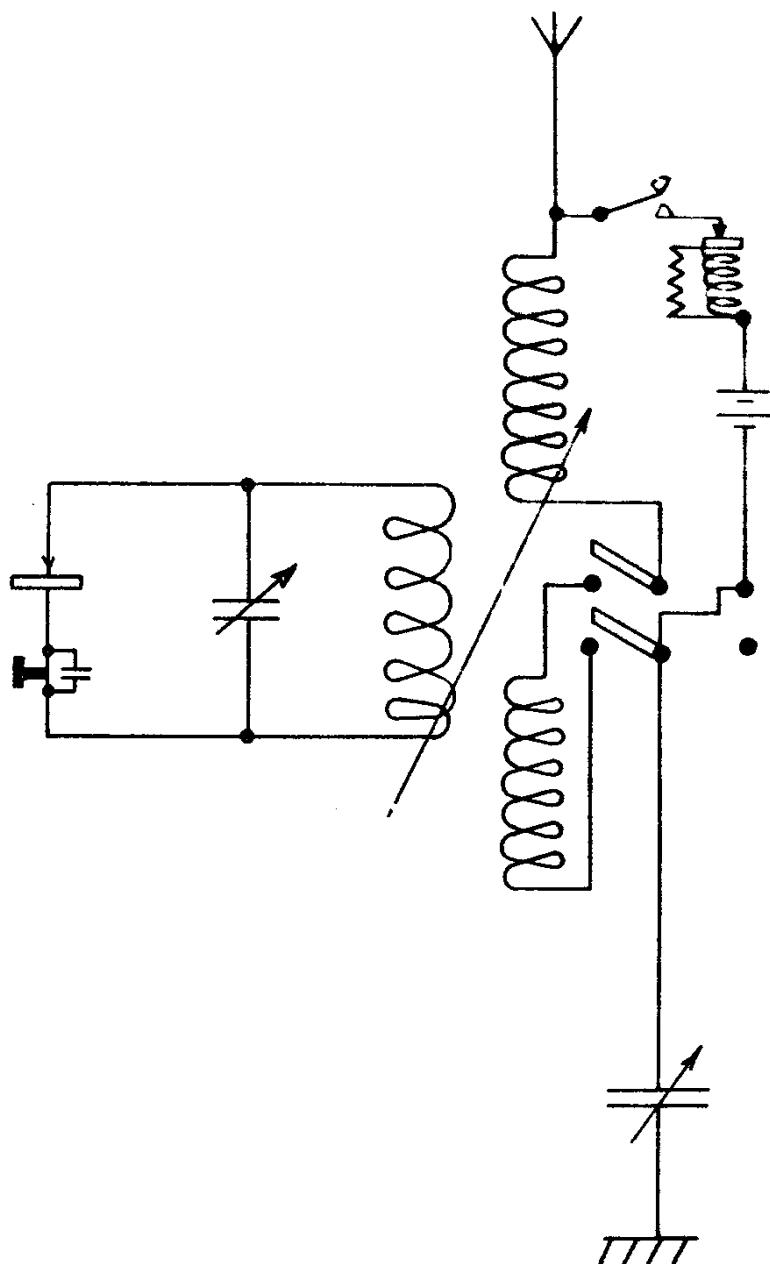
TUNER SHORT WAVE MARK III, III*
RECEIVER DIAGRAM.
THEORETICAL.

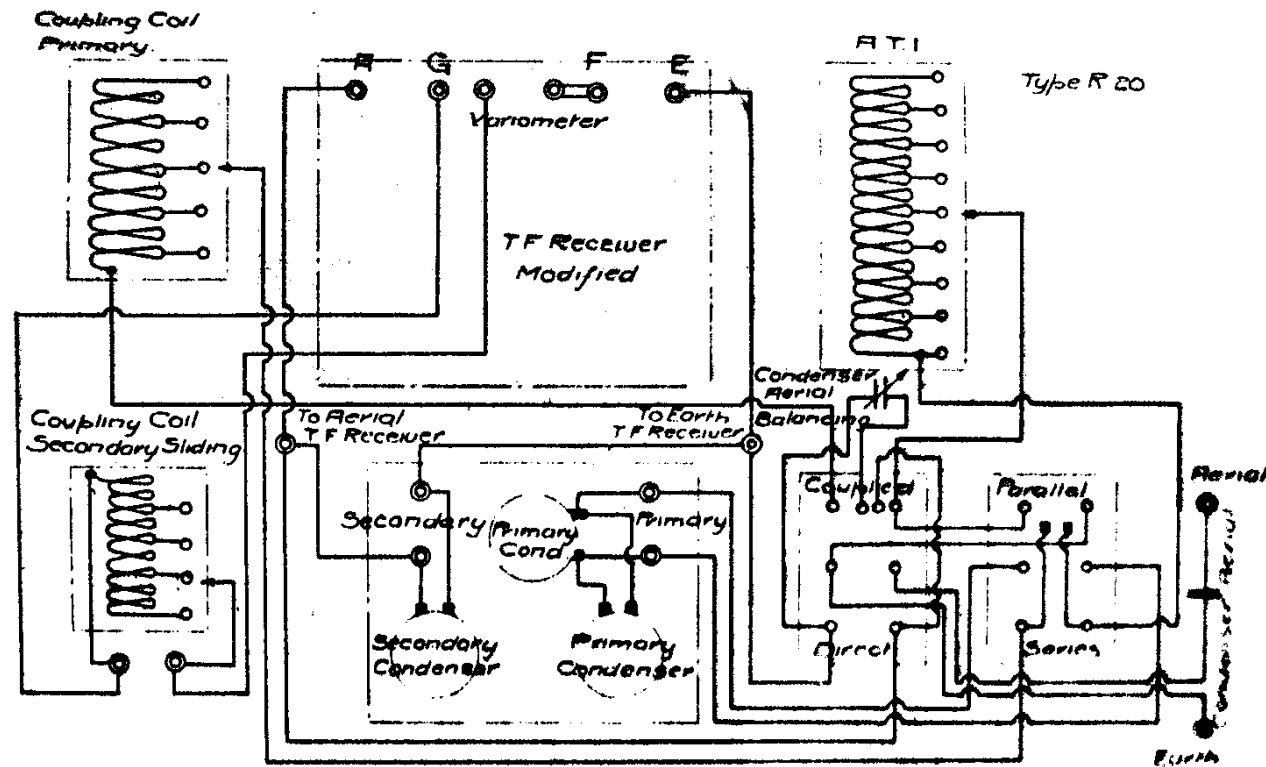
46



Either Detector May be Connected Either To A.B or C.D.
The Buzzer is at the Same Time Connected Either To C.D. or A.B.
In Mark III* the Buzzer is Always Connected Across C.D.

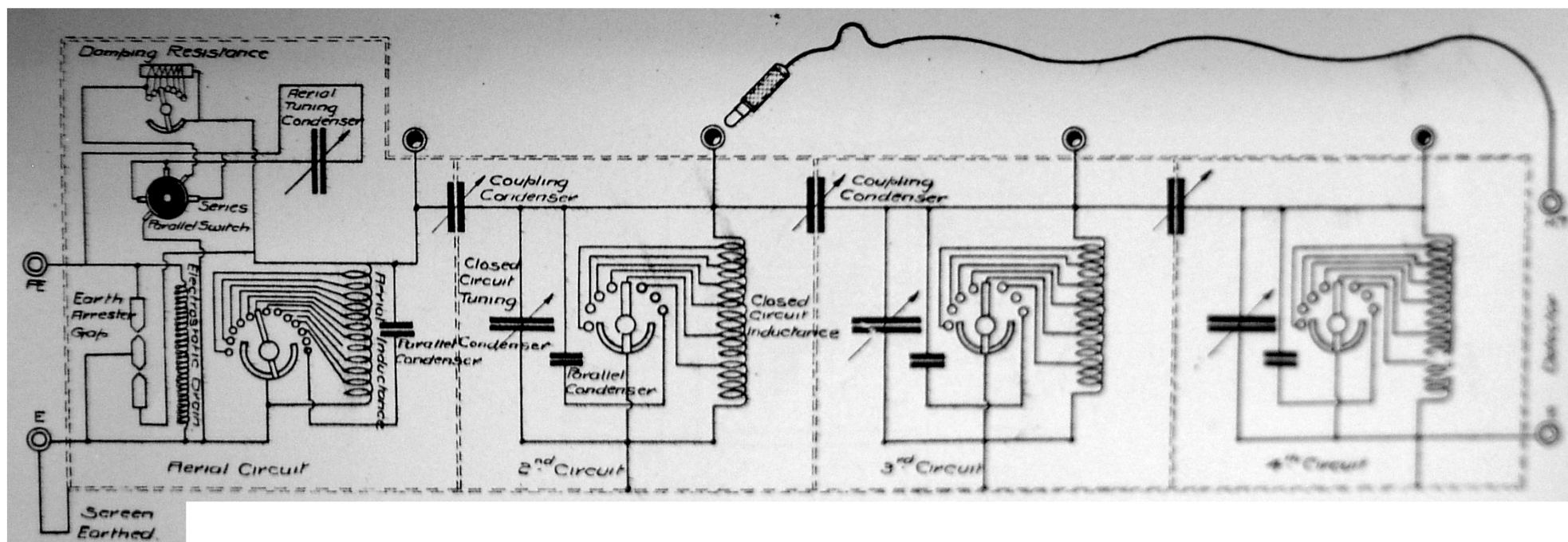
14





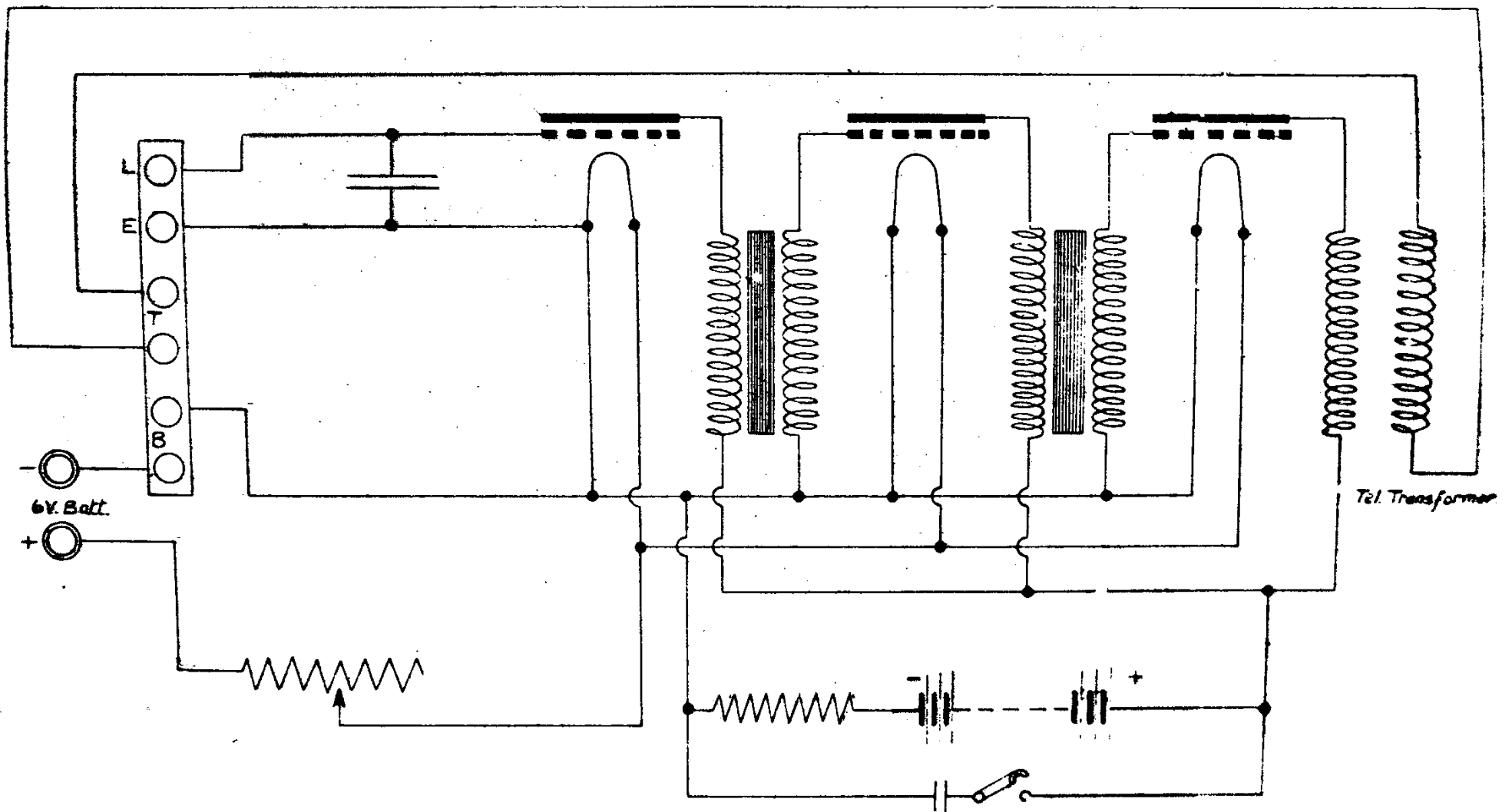
RECEIVER

GROUND TYPE R40



RECEIVER
TYPE R27

WIRING DIAGRAM OF TRIPLE VALVE AMPLIFIER. RELAY MODEL T.B



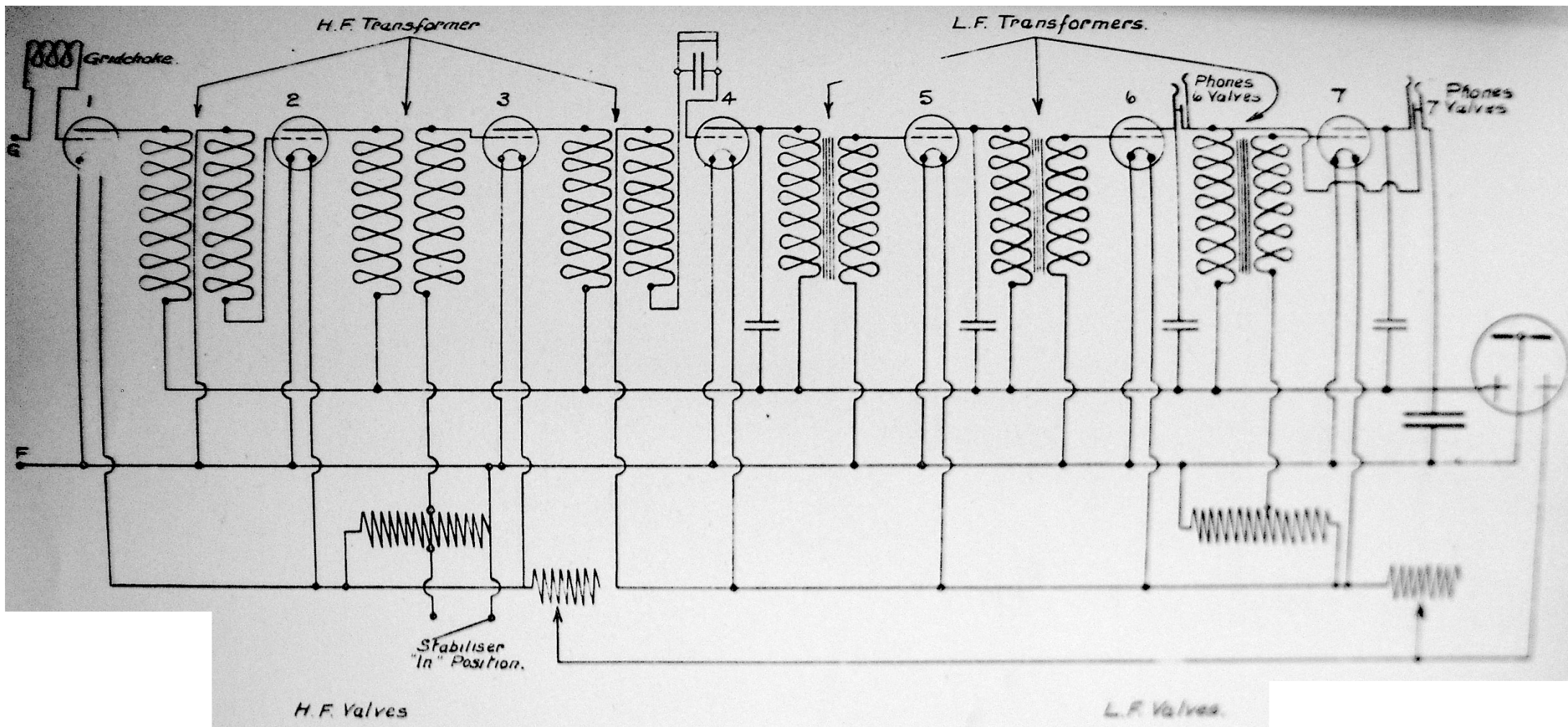
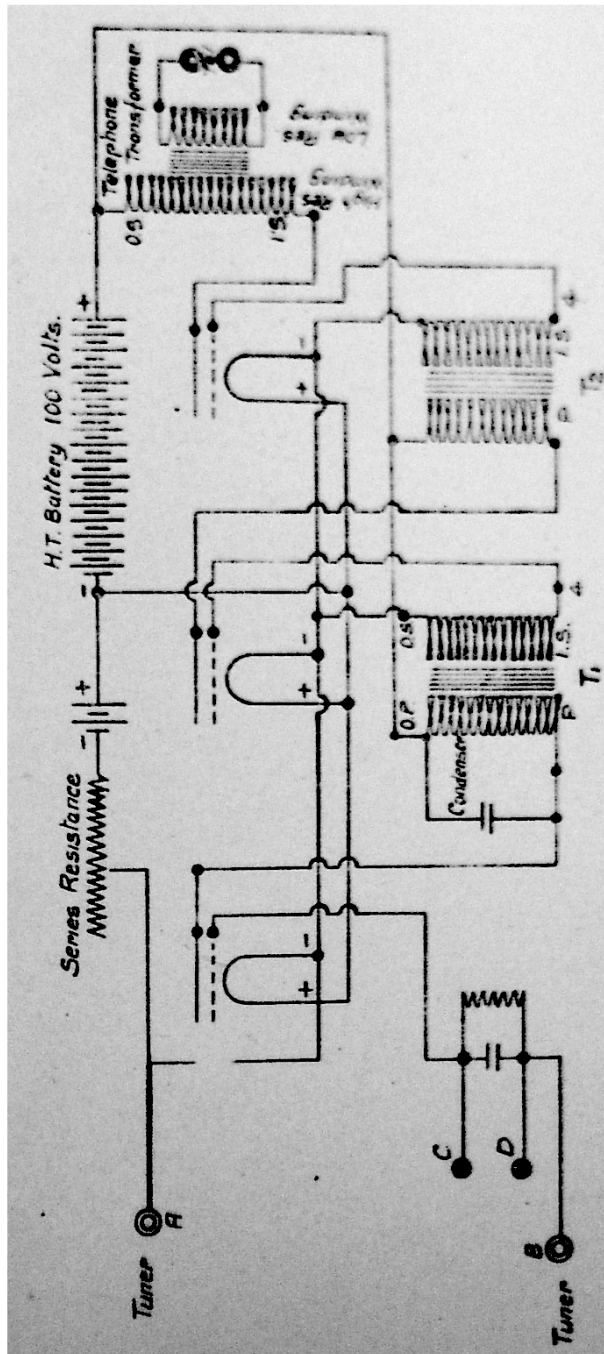


DIAGRAM OF CONNECTIONS OF 7 VALVE AMPLIFIER. MODEL T.R.

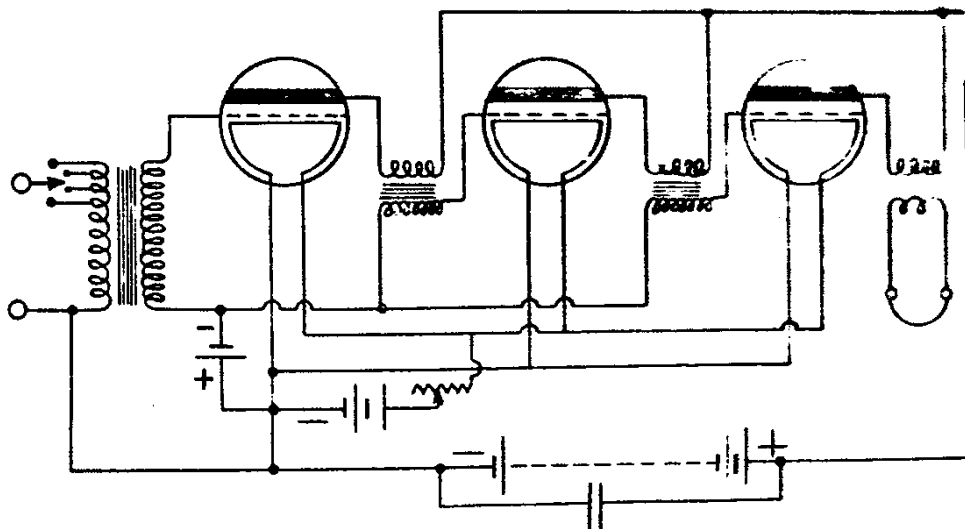
AMPLIFIER A. MARK IV

549



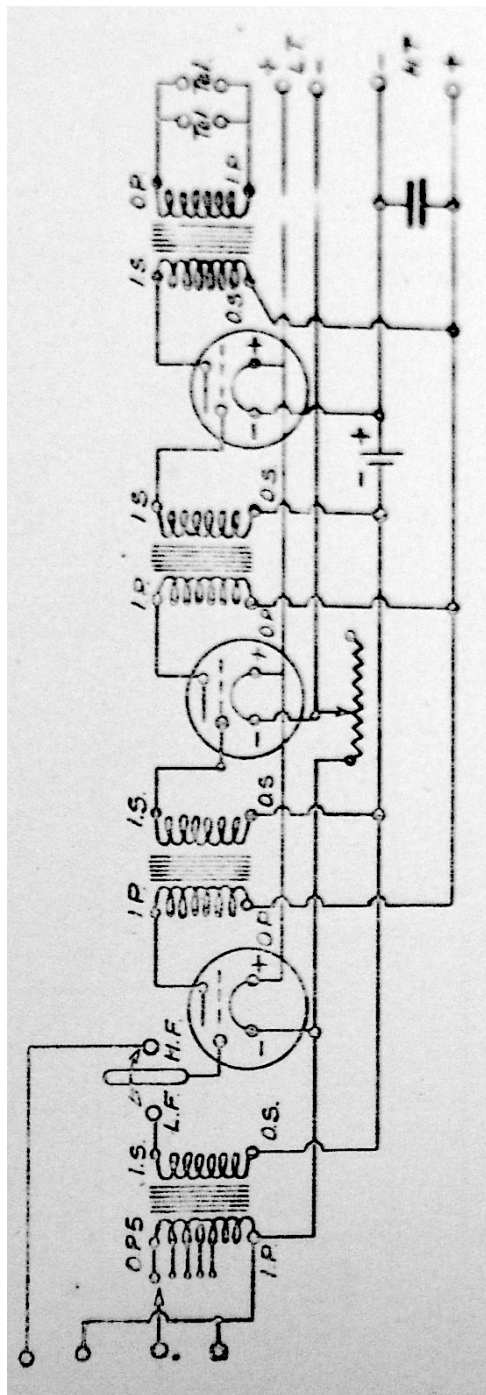
AMPLIFIER C. MARK II.

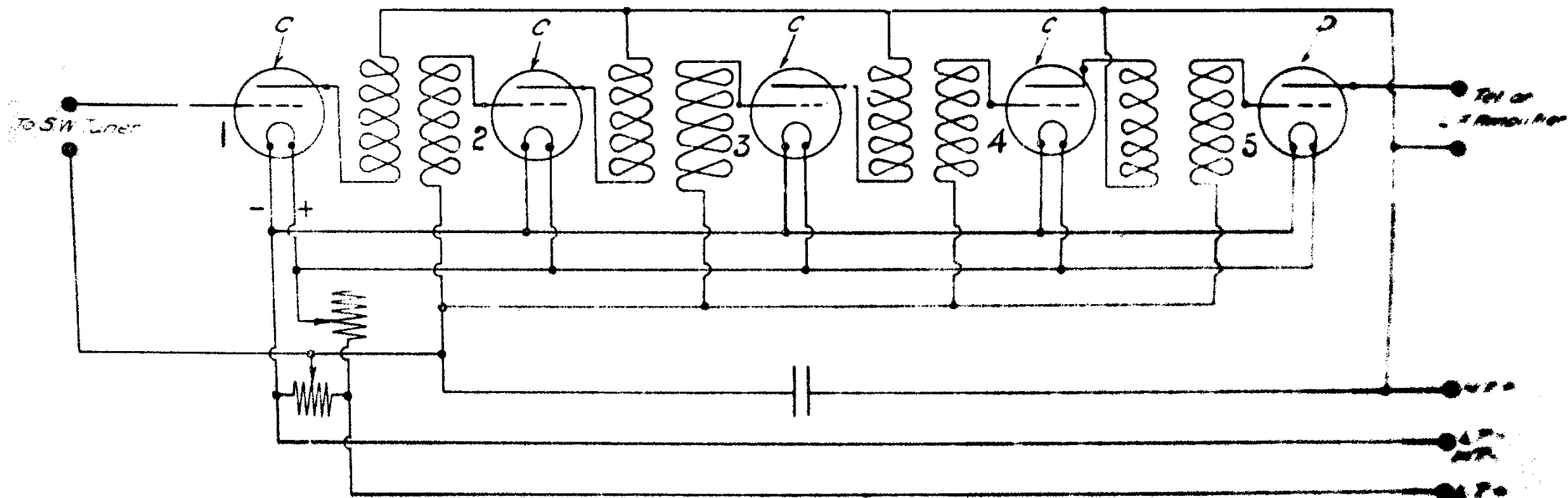
52



AMPLIFIER C. MARK IV.

86

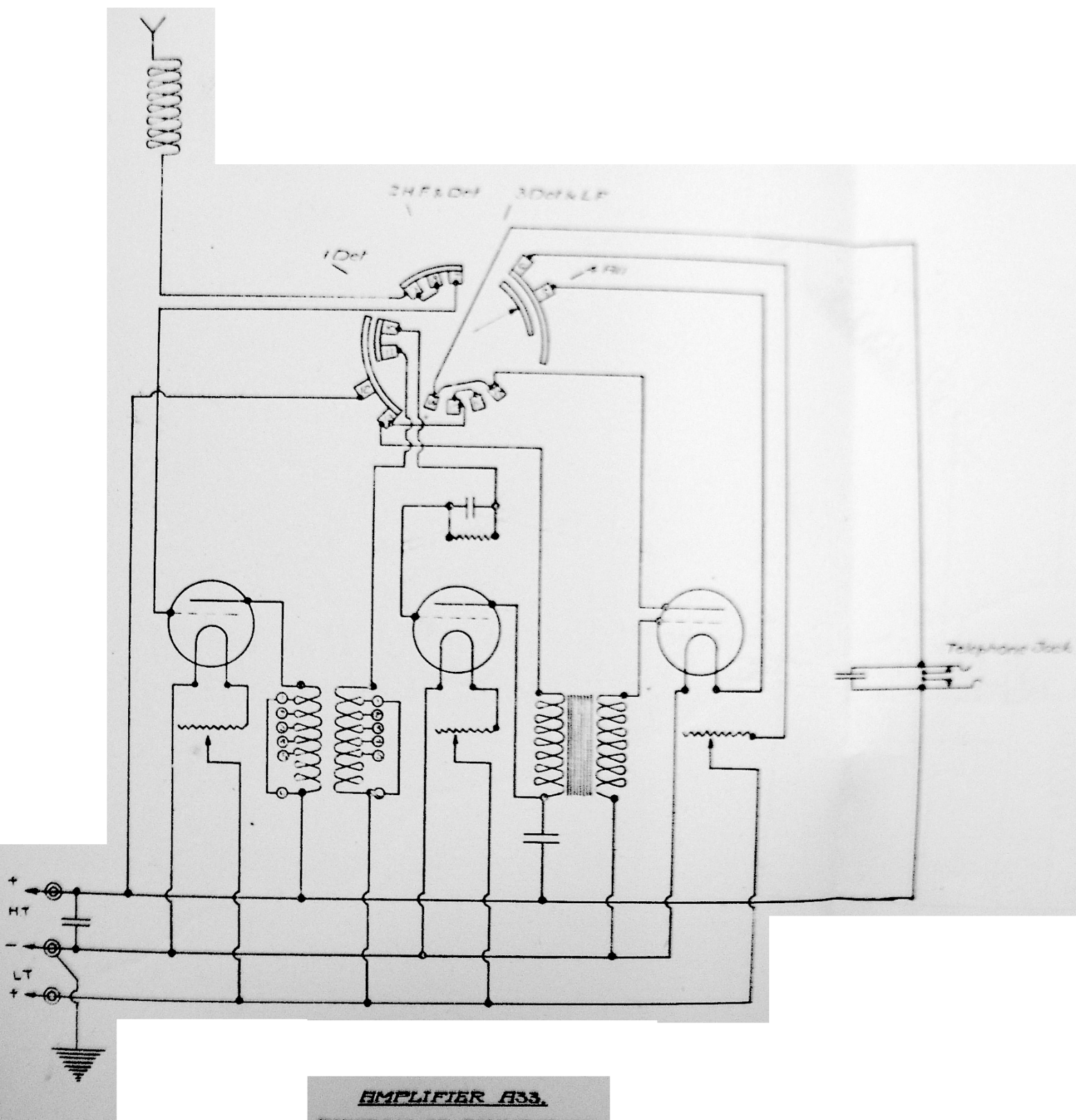


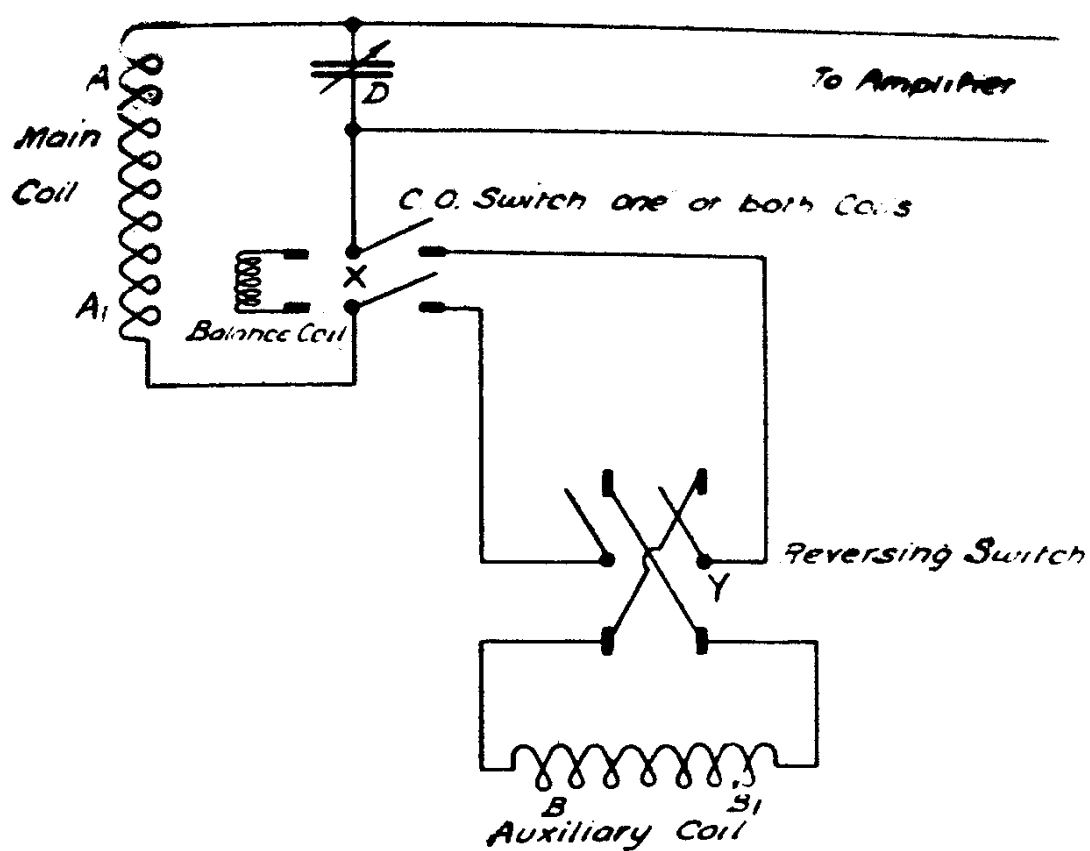


DIAGRAMMATIC CONNECTION SCHEME

2

AMPLIFIER 9AF TYPE 18





R.A.F. METHOD OF DIRECTION FINDING

THEORETICAL DIAGRAM

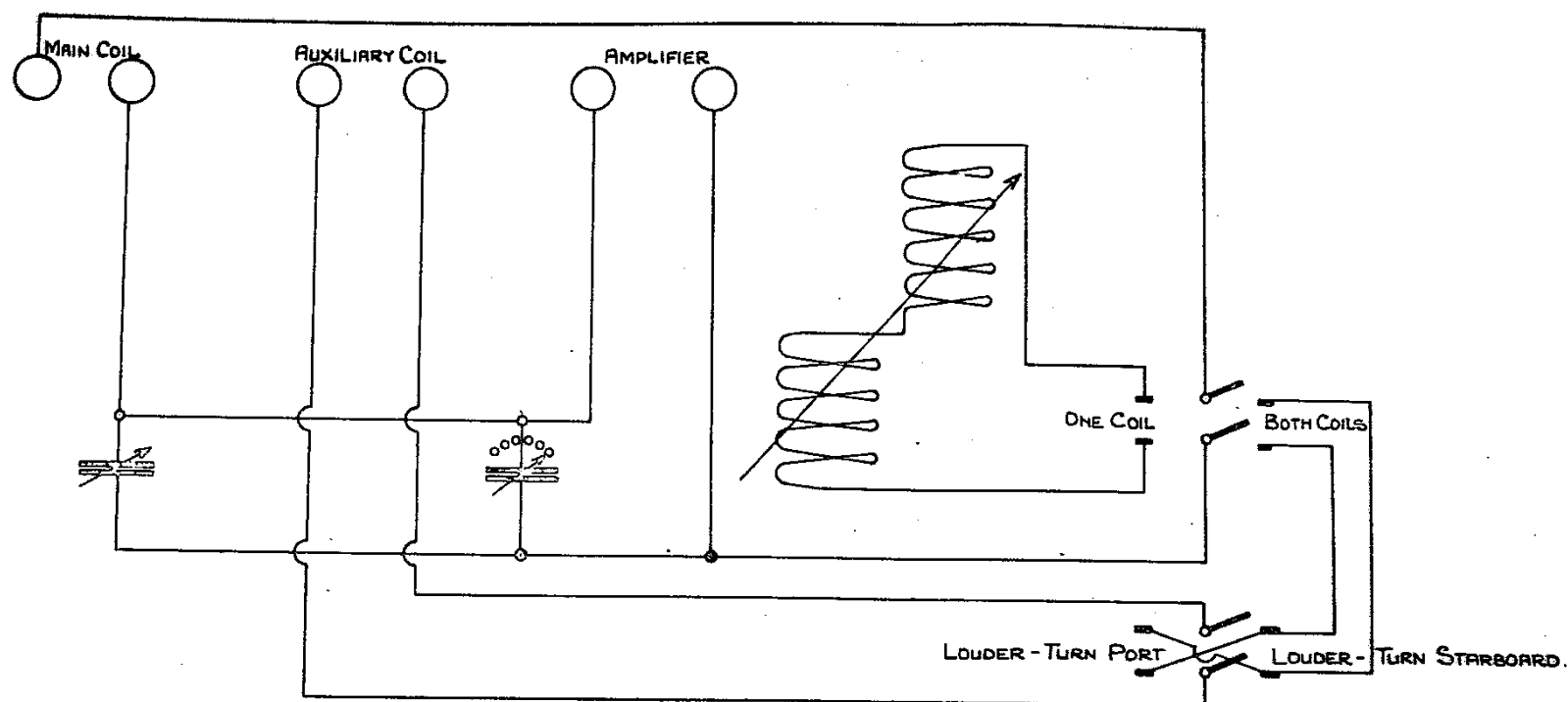
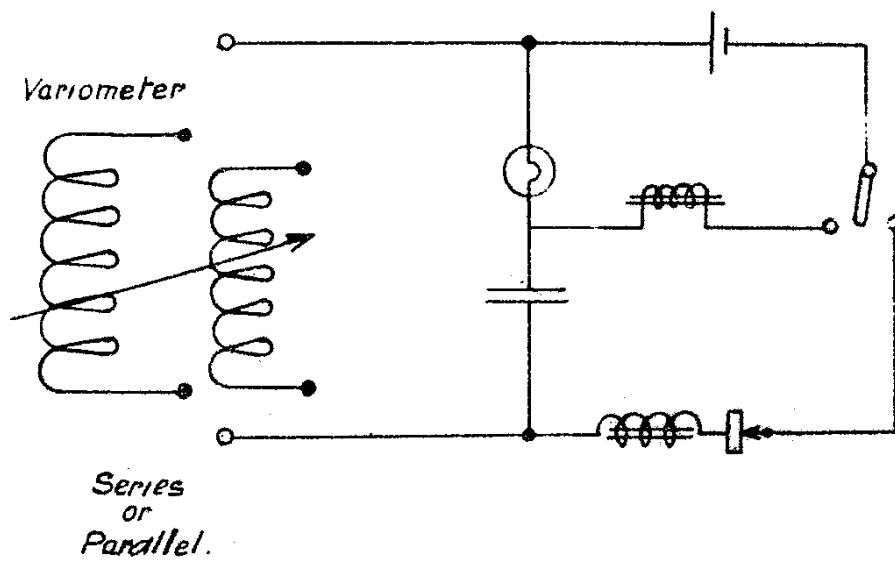
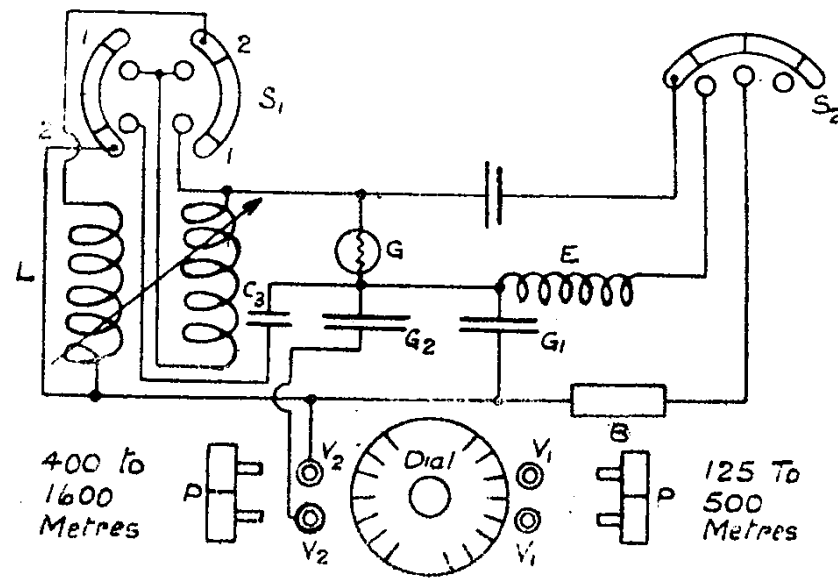


DIAGRAM OF CONNECTIONS
OF
TUNER SWITCH BOX.

WAVEMETER. C.W. N°1.

73

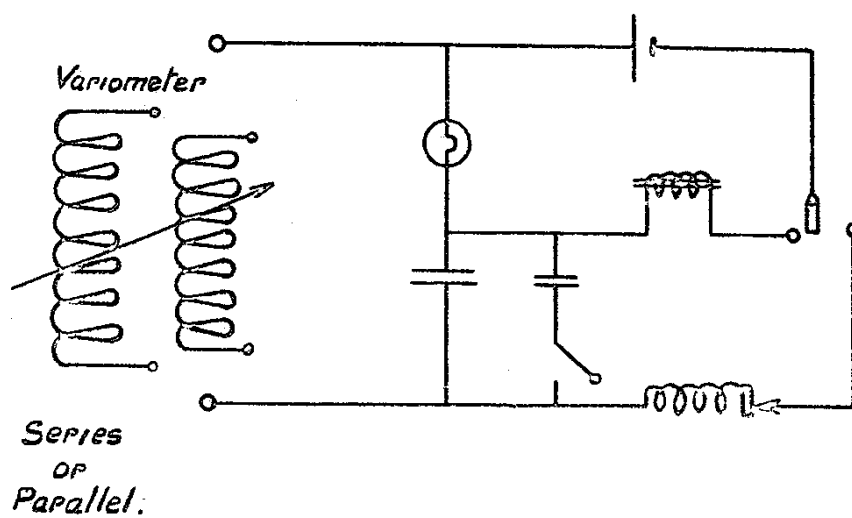


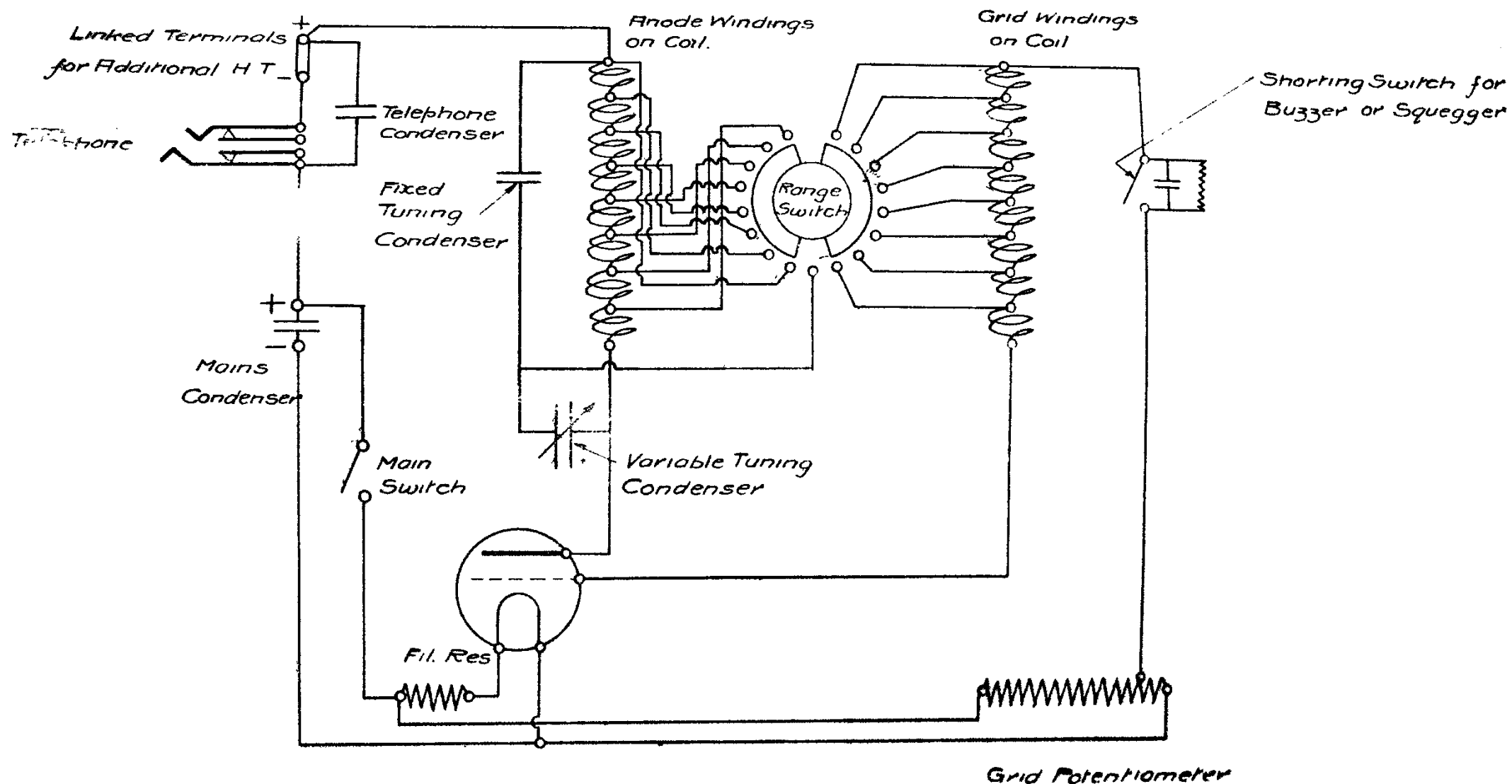


WAVEMETER. C.W. N^o 2. DIAGRAM OF CONNECTIONS.

WAVEMETER C.W. № 3.

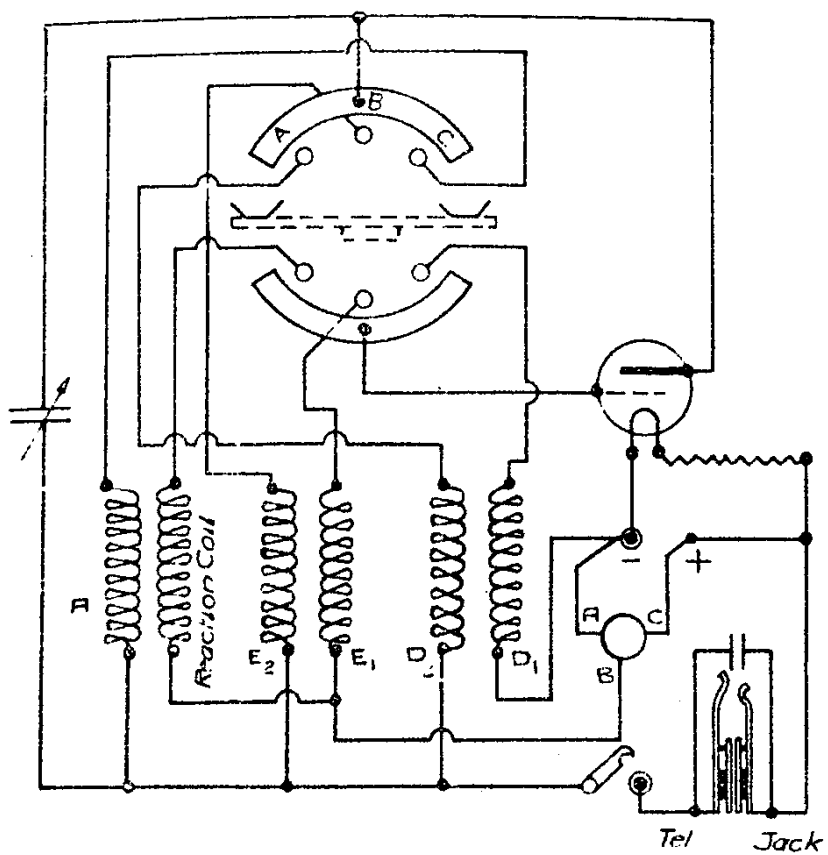
75





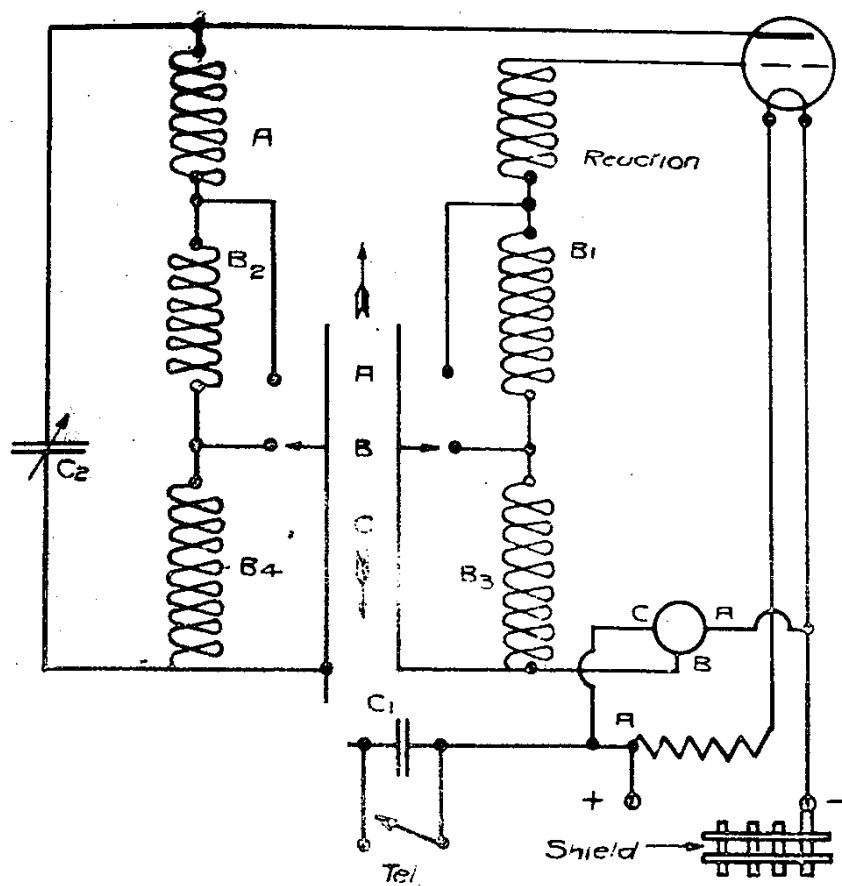
SYNTONISER. LONG RANGE.

300 - 20000 METRES



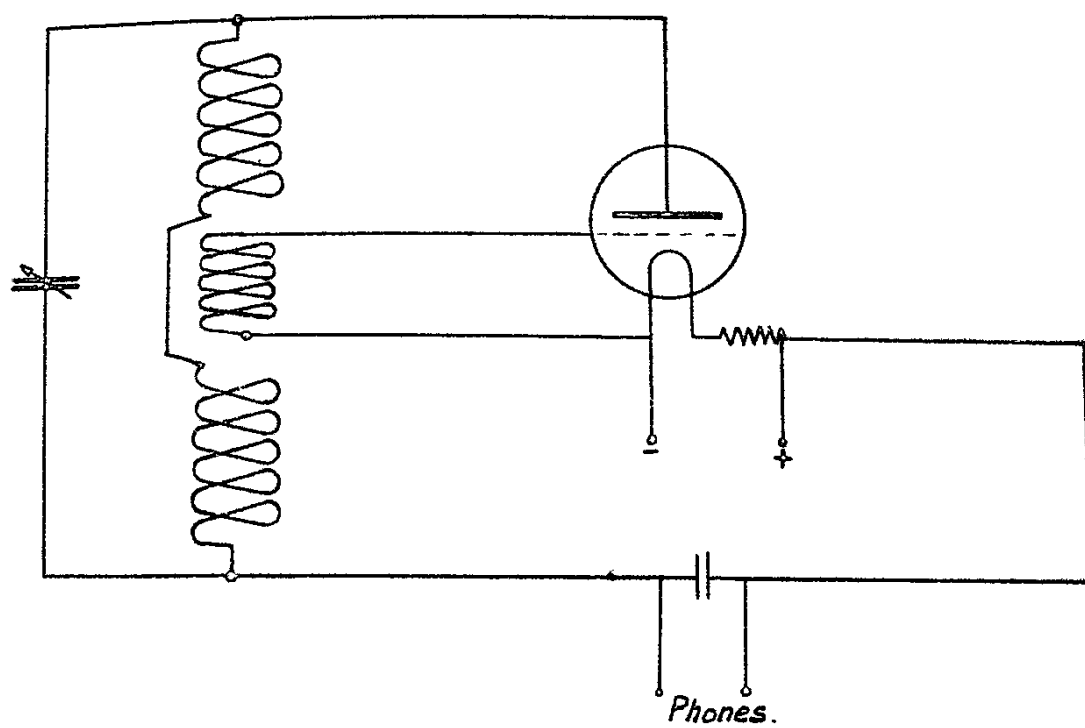
SYNTONISER

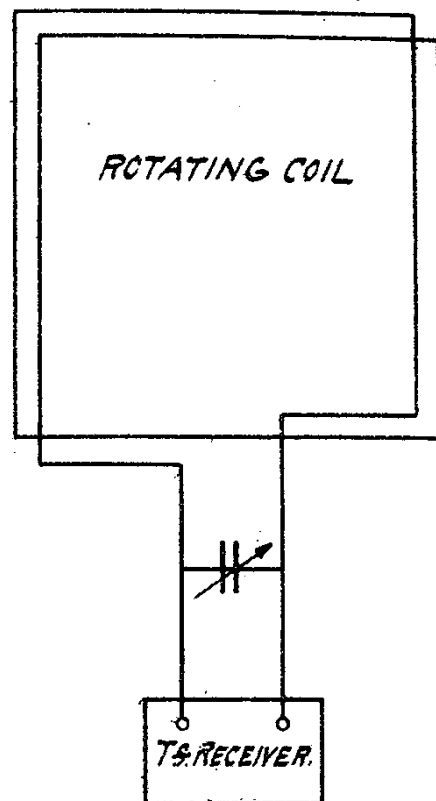
300 - 2500 METRES



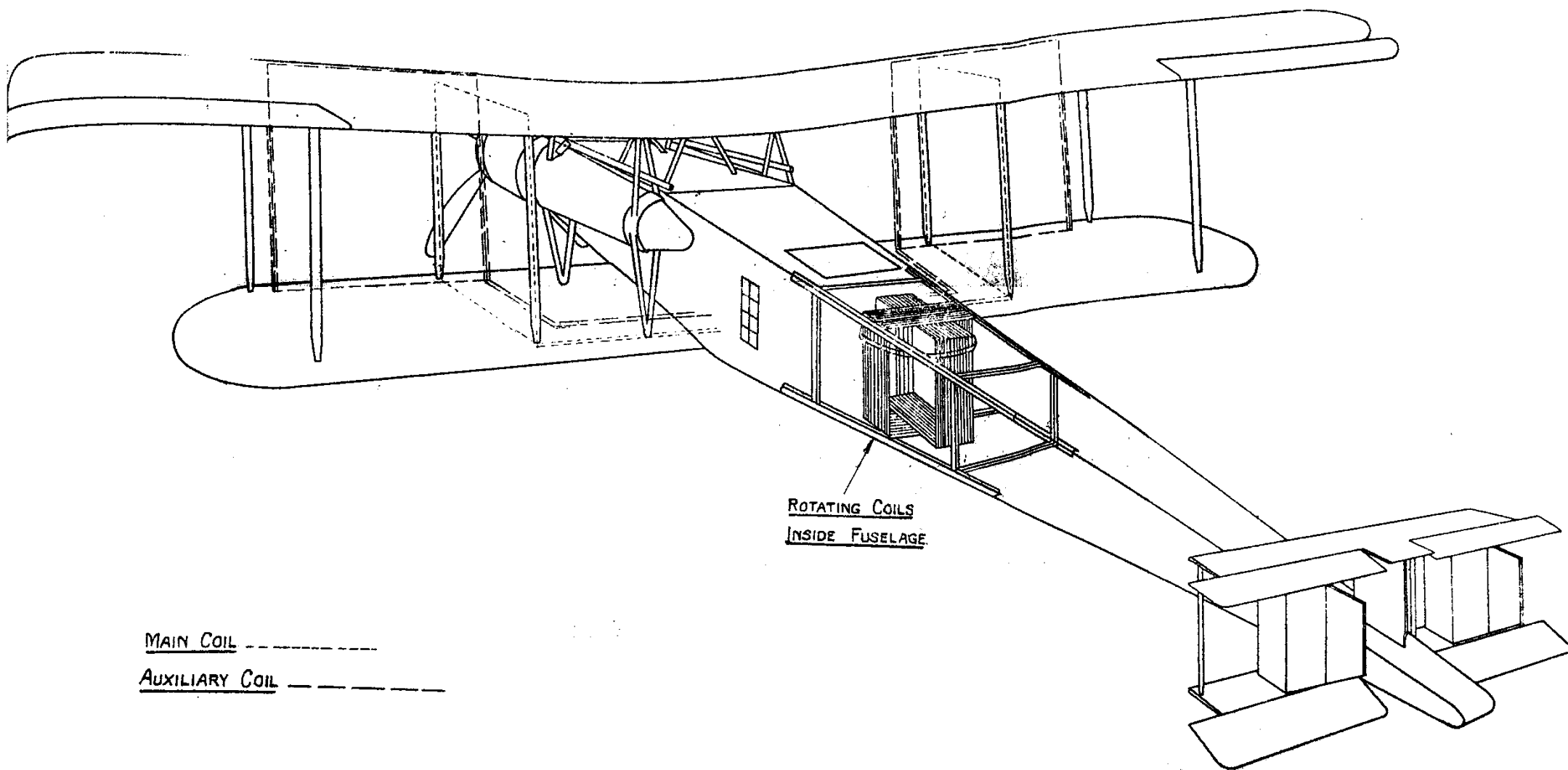
SYNTONISER

1000 TO 5000 METERS





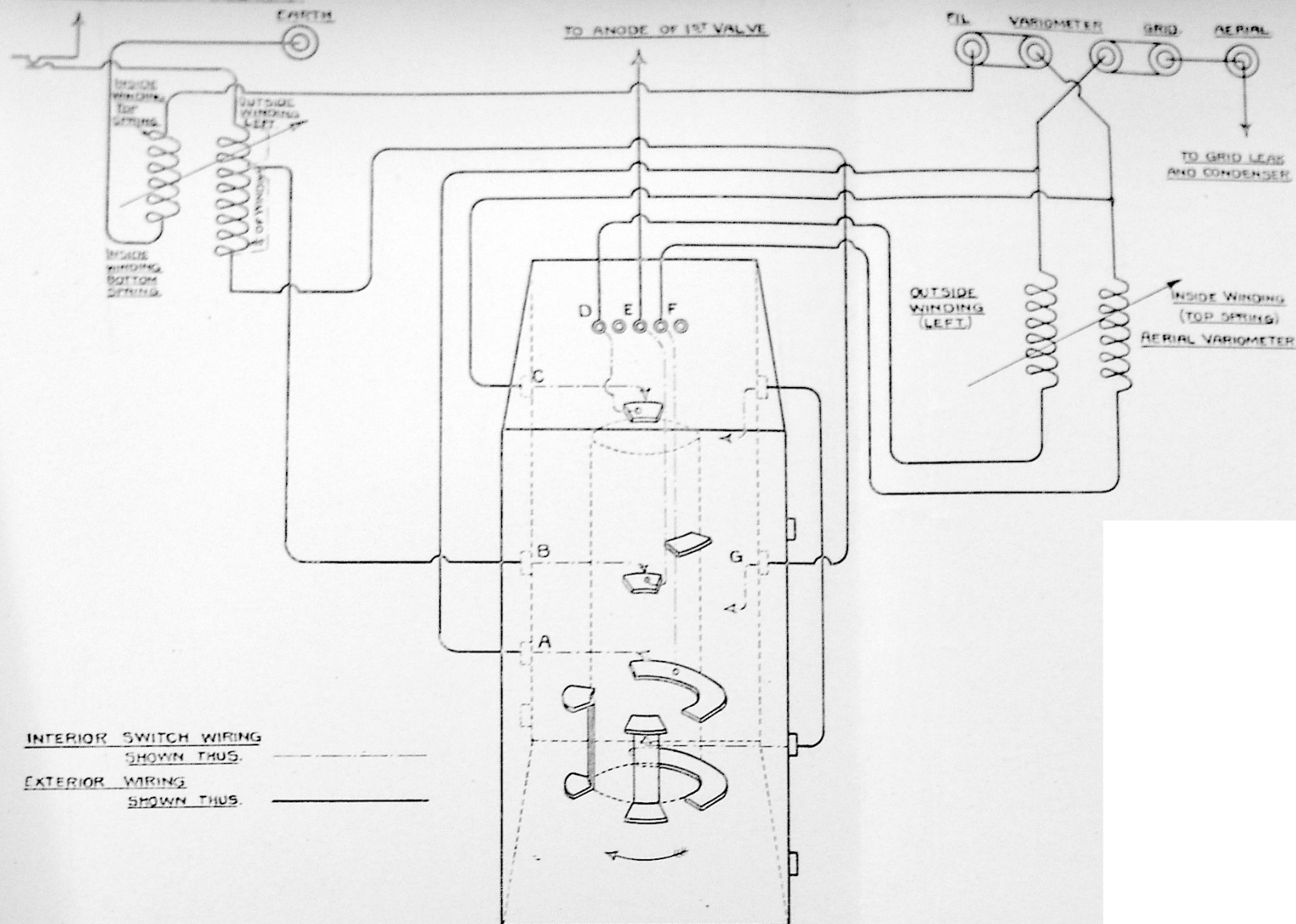
LOCATING STRANDED AIRCRAFT SET.



ARRANGEMENT OF D.F. COILS
IN HANDLEY PAGE MACHINE

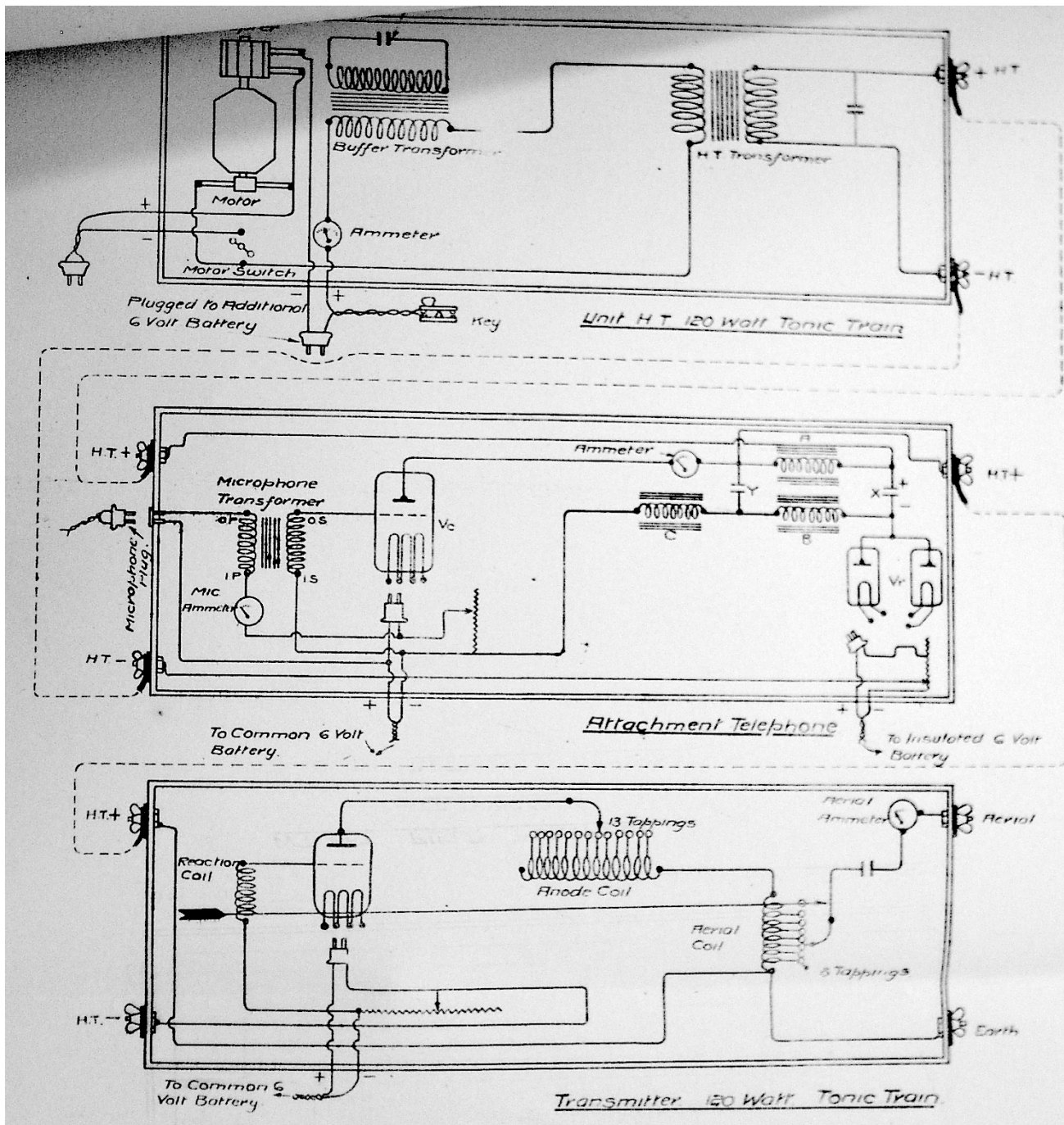
1ST TEL JACK
TO PRIMARY OF
1ST INTERVALVE TRANSFORMER

SWITCH WIRING FOR MODIFIED T.F. RECEIVER



INTERIOR SWITCH WIRING
SHOWN THUS. ————
EXTERIOR WIRING
SHOWN THUS. —————

NOTE. IN THE ABOVE DIAGRAM, THE SWITCH IS VIEWED FROM BOTTOM OF RECEIVER
THIS INCLUDES ALL THE ALTERATION IN THE WIRING NECESSARY FOR THE MODIFIED RECEIVER.
THE TWO SEGMENTS BLADE AND THREE CONTACTS SHOWN ARE NOT REQUIRED
AND ALL CONNECTIONS SHOULD BE REMOVED FROM SAME.
SWITCH IN 500 TO 1500 METRES POSITION - FOR 1000 TO 4500 METRES SWITCH IS TURNED THRO' 90°
IN DIRECTION OF ARROW WHEN VIEWED FROM BACK.



W.T. SET. FIELD PORTABLE
120 WATT TONIC TRAIN
WITH TELEPHONE ATTACHMENT